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PREFACE.

THIS work is not intended to take the place of any other, nor to constitute a necessary part of the Series to which it belongs, nor is it adapted to the use of those just commencing the study of Arithmetic; but it has been prepared to meet a demand in graded and advanced schools for a larger number of carefully prepared and practical examples for review, drill, and test exercises, than are furnished from ordinary text-books, and is to be used in connection with any systematic class-book, or Series on the subject.

Of course it is no substitute for a *systematic* treatise. On the contrary, its leading aim is, to bring together *promiscuously* a large number of examples involving all the principles and ordinary processes of theoretical and practical arithmetic, both Mental and Written, without rules, analyses, processes, or answers.

Such a work cannot fail to be of great utility, if properly used, in thoroughly exercising the pupil's judgment; in bringing into use his knowledge of the theory and applications of numbers, previously obtained from some systematic treatise; in cultivating a habit of patient investigation and self-reliance; *in testing the truth and accuracy of his own work by proof*—the only true test he will have to depend upon in all the computations in the real business transactions in after-life; in a word, in making him independent of text-books, written rules, and analyses.

Although the examples are mixed, and *without gradation,* yet there is a *general classification* of them, the work being divided into six chapters. The first chapter presents the Standards and Tables of Weights and Measures, and numerous Comparative and Miscellaneous Tables, valuable for reference; the second involves the applications of the Elementary Rules of Arithmetic, and the Properties of Numbers; the third embraces Simple, Common, and Decimal Fractions; the fourth takes in Compound and Denominate Numbers and Proportion; the fifth includes Percentage, in all its varied applications; and the sixth comprehends all other subjects properly belonging to this Science.

The examples in each chapter involve the combination and application of the principles and processes contained in the preceding ones, but not to any extent those of the following chapters. Classes, therefore, that in regular course have gone over the Simple Rules of Arithmetic only, will find in the second chapter of this book all they need in the way of supplementary examples for drill and review. Those who have finished Fractions in any regular text-book will here have in Chapter Third proper exercises for testing their knowledge and skill in this part of the science; and so they may proceed, by successive reviews, till the same searching test comes to be applied to every part of the subject.

Two editions are printed; one with answers at the close of the book for the use of *teachers only;* the other edition is without answers, and designed for the use of *classes.*

BROOKLYN, January, 1875 D. W. F.

MEASURES.

CHAPTER I.

1. A ***Measure*** is a *standard unit,* established by law or custom, by which *quantity,* as extent, dimension, capacity, amount, or value is measured or estimated.

Thus, the *standard unit* of Measures of Extension is the *yard;* of Liquid Measure, the *wine gallon;* of Dry Measure, the *Winchester bushel;* of Weight, the *Troy pound,* etc. Hence the length of a piece of cloth is ascertained by applying the *yard* measure; the capacity of a cask, by the use of the *gallon* measure; of a bin, by the use of the *bushel* measure; the weight of a body, by the *pound* weight, etc.

2. Measures may be classified into *six kinds*:

1. Extension.
2. Capacity.
3. Weight.
4. Time.
5. Angles or Arcs.
6. Money or Value.

MEASURES OF EXTENSION.

3. ***Extension*** has *length, breadth,* and *thickness.*

4. A ***Line*** has *length* only.

5. A ***Surface or Area*** has *length* and *breadth.*

6. A ***Solid*** has *length, breadth,* and *thickness.*

LINEAR MEASURE.

7. *Linear Measure,* also called ***Long Measure*** is used in measuring lines and distances.

TABLE.

12	Inches (*in.*)	= 1 Foot	*ft.*
3	Feet	= 1 Yard	*yd.*
5½ 16½	Yards, or Feet	= 1 Rod	*rd.*
320	Rods	= 1 Mile	*mi.*

1 *Mi.* = 63360 *in.*, 5280 *ft.*, 1760 *yd.*, 320 *rd.*

8. *Cloth Measure* is practically out of use. In measuring goods sold by the yard, the yard is divided into *halves, fourths, eighths,* and *sixteenths.*

2¼	Inches	= 1 Sixteenth,	$\frac{1}{16}$ *yd.*
2	Sixteenths, (4½ in.)	= 1 Eighth,	$\frac{1}{8}$ *yd.*
2	Eighths, (9 in.)	= 1 Quarter,	$\frac{1}{4}$ *yd.*
4	Quarters	= 1 Yard,	1 *yd.*

At U. S. Custom-Houses, in estimating duties, the yard is divided into *tenths* and *hundredths.*

9. *Mariners* use the following denominations :

9	Inches	= 1 Span,	*Sp.*
8	Spans or 6 Ft.	= 1 Fathom,	*fath.*
120	Fathoms	= 1 Cable's Length,	*c. l.*
7⅓	C. Length	= 1 Nautical Mile (or Knot),	*mi.*
3	Miles	= 1 League,	*lea.*

10. In *geographical* and *astronomical* calculations :

1	Geographic Mile	= 1.15 Statute Miles.
3	" "	= 1 League.
60 69.16	" " or Statute "	= 1 Deg. of Latitude on a Meridian, or of Long. on the Equator.
360 Degrees		= the Circumference of the Earth.

11. The following are sometimes used:

3 Barley-corns, or Sizes = 1 Inch. Used by shoemakers.
4 Inches = 1 Hand. " to measure the height of horses at the shoulder.
$3\frac{3}{10}$ Feet = 1 Pace.
3 Inches = 1 Palm.
21.888 Inches = 1 Sacred Cubit.
6 Points = 1 Line. } Used in clock-making.
12 Lines = 1 Inch. }

1. The nautical mile (or knot) is the same as the geographical mile, and is used in measuring the speed of vessels.

2. The geographical mile is $\frac{1}{60}$ of $\frac{1}{360}$ or $\frac{1}{21600}$ of the distance round the center of the earth. It is a small fraction more than 1.15 statute miles.

3. The length of a degree of latitude varies, being 68.72 miles at the equator, 68.9 to 69.05 miles in middle latitudes, and 69.30 to 69.34 miles in the polar regions. The mean or average length, 69.16, is the standard recently adopted by the U. S. Coast Survey. A degree of longitude is greatest at the equator, where it is 69.16 miles, and it gradually decreases toward the poles, where it is 0.

12. ***Surveyors' Linear Measure*** is used by land surveyors in measuring roads and boundaries of land.

TABLE.

7.92 Inches = 1 Link . . . *l.*
25 Links = 1 Rod . . . *rd.*
4 Rods = 1 Chain . . . *ch.*
80 Chains = 1 Mile . . . *mi.*

1 *Mi.* = { 63360 *in.*, 8000 *l.*, 320 *rd.*, 80 *ch.*

1. A ***Gunter's Chain*** is the *unit* of measure, and is 4 rods, or 66 feet long, and consists of 100 links.

2. *Engineers* commonly use a chain or *measuring tape,* 100 feet long, each foot divided into *tenths.*

3. *Measurements* are recorded in *chains* and *hundredths.*

13. COMPARISON OF DISTANCES.

Country.	Distance.	U. S. mile.	Country.	Distance.	U. S. mile.
England,	1 Mile	= 1	Russia,	1 Verst	= .66
France,	1 Km.	= .62	Turkey,	1 Berri	= 1.04
Spain,	1 League	= 4.15	Portugal,	1 Milha	= 1.28
Prussia,	1 Meile	= 4.93	Persia,	1 Farsang	= 4.17
Austria,	1 Meile	= 4.98	China,	1 Li	= .35
Sweden,	1 Mil	= 6.64	Egypt,	1 Mili	= 1.15
Switzerland,	1 Lieue	= 2.98	East Indies,	1 Coss	= 1.14
Mexico,	1 Silio	= 6.76	Japan.	1 Ri	=2.562

SURFACE, OR SQUARE, MEASURE.

14. ***Surface*** or ***Square Measure*** is used in computing areas or surfaces; as of land, boards, painting, plastering, paving, etc.

TABLE.

144 Square Inches (*sq. in.*) = 1 Square Foot . . *sq. ft.*
9 Square Feet = 1 Square Yard . . *sq. yd.*
30¼ Square Yards = 1 Sq. Rod or Perch *sq. rd.; P.*
160 Square Rods = 1 Acre . . . . . . *A.*
640 Acres = 1 Square Mile . . *sq. mi.*

sq. mi.	*A.*	*sq. rd.*	*sq. yd.*	*sq ft.*	*sq. in.*
1 =	640 =	102400 =	3097600 =	27878400 =	4014489600
	1 =	160 =	4840 =	43560 =	6272640
		1 =	30¼ =	272¼ =	39204
			1 =	9 =	1296
				1 =	144

15. ***Artificers*** estimate their work as follows:

By the *square foot;* as in glazing, stone-cutting, etc.

By the *square yard*, or by the *square* of 100 square feet; as in plastering, flooring, roofing, paving, etc.

One thousand shingles, averaging 4 in. wide, and laid 5 in. to the *weather*, are estimated to be a *square*.

16. *Surveyors' Square Measure* is used by surveyors in computing the area or contents of *land.*

TABLE.

625 Square Links (*sq. l.*) = 1 Pole . . . . . . *P.*
16 Poles = 1 Square Chain . . *sq. ch.*
10 Square Chains = 1 Acre . . . . . . *A.*
640 Acres = 1 Square Mile . . . *sq. mi.*
36 Square Miles (6 miles square) = 1 Township . . . *Tp.*

Tp.	*sq. mi.*	*A.*	*sq. ch.*	*P.*	*sq. l.*
1 =	36 =	23040 =	230400 =	3686400 =	2304000000
	1 =	640 =	6400 =	102400 =	6400000
		1 =	10 =	100 =	100000

1. The ***Acre*** is the *unit* of land measure.

2. Government lands are divided into *Townships,* by parallels and meridians, each containing 36 square miles or *Sections.* Each section contains 640 acres (1 sq. mile), and is subdivided into *half-sections, quarter-sections,* etc.

3. Measurements of land are commonly recorded in *square miles, acres,* and *hundredths* of an acre. The *rood* is no longer used.

CUBIC OR SOLID MEASURE.

17. *Cubic* or ***Solid Measure*** is used in computing the contents of solids; as timber, wood, stone, boxes of goods, the capacity of rooms, etc.

TABLE.

1728 Cubic In. (*cu. in.*) = 1 Cubic Ft., *cu. ft.*
27 Cubic Ft. = 1 Cubic Yd., *cu. yd.*

1 *cu. yd.* = { 46656 *cu. in.*
27 *cu. ft.*

1. A *Register Ton,* used in measuring the entire internal capacity or *tonnage* of vessels, is 100 cubic feet.

2. A *Shipping Ton,* used in measuring cargoes, is 40 cubic feet in the U. S., and in England 42 cubic feet.

18. *Wood Measure* is used to measure wood and rough stone.

TABLE.

16 Cubic Feet	=	1 Cord Foot	*cd. ft.*
8 Cord Feet, or 128 Cubic Feet	=	1 Cord	*Cd.*
24¾ Cubic Feet	=	1 Perch of Stone, or of Masonry.	*Pch.*

A *Cord* of wood is a pile 8 ft. long, 4 ft. wide, and 4 ft. high.

A *cord-foot* is 1 ft. in length of such a pile; that is, 1 ft. long, 4 ft. wide, and 4 ft. high.

A *Perch* of stone or of masonry is 16½ ft. long, 1½ ft. wide, and 1 ft. high. Stone-masons usually call 25 cu. ft. a perch.

19. *Duodecimals* are the parts of a unit resulting from continually dividing by 12, and are sometimes used in measuring surfaces and solids.

TABLE.

12 Fourths ('''')	=	1 Third . . .	1'''	1 *Ft.* =	20736''''
12 Thirds	=	1 Second . . .	1''		1728'''
12 Seconds	=	1 Prime . . .	1'		144''
12 Primes	=	1 Foot	*Ft.*		12'

The marks ', '', ''', '''', are called indices.

Railroad and transportation companies estimate light freight by the space it occupies in *cubic feet*, but heavy freight by *weight*.

Masonry is estimated by the *cubic foot*, and *perch;* also by the *square foot* and *square yard.*

Materials are usually estimated by cubic measure; the *work* by cubic, or by square measure.

Engineers, in making estimates for *excavations* and *embankments*, take the dimensions with a line or measure divided into feet and decimals of a foot. The computations are made in feet and decimals, and the results are reduced to *cubic yards*. In civil engineering, the *cubic yard* is the *unit* to which estimates for excavations *and embankments are finally* reduced.

A cubic yard of common earth is called a *load.*

Brickwork is generally estimated by the 1000 *bricks,* sometimes in *cubic feet.*

Bricks are of various dimensions. The average size of a *common* brick is 8 in. long, 4 in. wide, and 2 in. thick.

Philadelphia or Baltimore front bricks are 8¼ × 4⅛ × 2⅜ inches; North River bricks, 8 × 3½ × 2¼ inches; Maine bricks, 7½ × 3⅜ × 2⅜; and Milwaukee bricks, 8½ × 4⅛ × 2⅜ inches.

A cubic foot is estimated to contain 27 bricks laid dry. Laid in mortar, an allowance is made of from ⅒ to ⅛ for the mortar.

Five courses of bricks in the height of a wall are called a foot.

A brick wall which is a brick and a half thick is said to be of the *standard thickness.*

In estimating *material,* allowance is made for doors, windows, and cornices.

In estimating the *work,* masons measure each wall on the *outside.* Ordinarily, no allowance is made for doors, windows, and cornices, but sometimes an allowance of *one-half* is made, this being a matter of contract.

In scaling or measuring timber for shipping or freighting, ⅕ of the solid contents of round timber is deducted for waste in hewing or sawing. Thus, a log that will make 40 feet of hewn or sawed timber, actually contains 50 cubic feet by measurement; but its market value is only equal to 40 cubic feet of hewn or sawed timber.

Sawed timber, joists, plank, and scantlings are generally bought and sold by what is called *board measure. Hewn* and *round* timber by *cubic measure.*

In board and lumber measure, all estimates are made on 1 inch in thickness; in buying and selling lumber, *one-fourth* the price is added for every ¼ inch thickness over an inch.

In *Board Measure* all boards are assumed to be 1 in. thick.

A *board foot* is 1 ft. long, 1 ft. wide, and 1 inch thick; hence 12 board feet make 1 *cubic foot.*

Board feet are changed to cubic feet by dividing by 12.

Cubic feet are changed to board feet by multiplying by 12.

MEASURES OF CAPACITY.

20. ***Capacity*** signifies extent of *room* or *space.*

21. Measures of capacity are divided into two classes; Measures of Liquids and Measures of Dry Substances.

22. The ***Units*** of Capacity are the *Gallon* for Liquid, and the *Bushel* for Dry Measure.

LIQUID MEASURE.

23. ***Liquid Measure*** is used in measuring liquids; as spirituous liquors, oil, molasses, milk, water, etc.

TABLE.

4 Gills (*gi.*) = 1 Pint . . . *pt.*
2 Pints = 1 Quart . . . *qt.*
4 Quarts = 1 Gallon . . . *gal.*

$$1\ \textit{Gal.} = \begin{cases} 32\ \textit{gi.} \\ 8\ \textit{pt.} \\ 4\ \textit{qt.} \end{cases}$$

The *Standard Liquid Gallon* of the United States contains 231 cubic inches, and is equal to about $8\frac{1}{3}$ lb. Avoir. of pure water.

The *Imperial Gallon* of Great Britain contains 277.274 cubic inches, and is equal to about 1.2 U. S. liquid gallons.

The *Old Ale or Beer Measure* is out of use. The gallon contained 282 cubic inches.

24. In estimating the capacity of cisterns, reservoirs, etc.:

$31\frac{1}{2}$ Gallons make 1 Barrel . . . *bbl.*
63 Gallons " 1 Hogshead . . *hhd.*

1. The barrel and hogshead are not fixed measures, but vary when used for commercial purposes, the former containing from 28 to 45 gallons, the latter from 60 to 125 gallons.

2. In some of the New England States the barrel is estimated at 32 gallons; in some States $31\frac{1}{2}$ gallons, and in others from 28 to 32.

3. The tierce, hogshead, pipe, puncheon, butt and tun are the name of casks, and do not express any fixed or definite measures. They are usually gauged, and have their capacities in gallons marked on them.

25. *Apothecaries' Fluid Measure* is used by physicians and apothecaries in prescribing and compounding *liquid* medicines.

TABLE.

60 Minims, or drops (♏ or *gtt.*) = 1 Fluidrachm . . *f*ʒ.
8 Fluidrachms = 1 Fluidounce . . *f*℥.
16 Fluidounces = 1 Pint . . . . . *O.*
8 Pints = 1 Gallon . . . . *Cong.*

Cong. 1 = *O.* 8 = *f*℥ 128 = *f*ʒ 1024 = ♏ 61440.

O. is an abbreviation of *octans,* the Latin for *one-eighth; Cong.* for *congiarium,* the Latin for gallon.

A common teaspoonful, or 45 drops, makes about one fluidrachm. A common teacup holds about 4 fluidounces; a common tablespoon, about half a fluidounce; a pint of water weighs a pound.

℞ is an abbreviation for *recipe,* or take; ā., aa., for equal quantities; j. for 1; ij. for 2; *ss.* for *semi,* or half; gr. for grain; P. for a little part; P. æq. for equal parts; q. p., as much as you please.

26. COMPARISON OF LIQUID MEASURES.

Country.	Measure.		U. S. gal.	Country.	Measure.		U. S. gal.
England,	1 Gal.	=	1.2	Switzerland,	1 pot	=	.40
France,	1 Dl.	=	2.64	Turkey,	Almud	=	1.38
Prussia,	1 Quart	=	.30	Mexico,	1 Fasco	=	.63
Austria,	1 Maas	=	.37	Brazil,	1 Medida	=	.74
Sweden,	1 Kanna	=	.69	Cuba,	1 Arroba	=	4.01
Denmark,	1 Kande	=	.51	South Spain,	1 Arroba	=	4.25

DRY MEASURE.

27. *Dry Measure* is used in measuring articles not liquid; as grain, fruit, salt, roots, etc.

TABLE.

2 Pints (*pt.*) = 1 Quart . . . *qt.*
8 Quarts = 1 Peck . . . *pk.*
4 Pecks = 1 Bushel . . *bu.*

1 *Bu.* = 64 *pt.* = 32 *qt.* = 4 *pk.*

The *Standard Bushel* of the United States contains 2150.42 cubic inches, and is a cylindrical measure 18½ inches in diameter and 8 inches deep.

The half-peck, or *dry gallon*, contains 268.8 cubic inches. *Six* quarts dry measure are equal, to nearly 7 quarts, liquid measure.

The *Imperial Bushel* of Great Britain contains 2218.192 cu. in.

The *English Quarter* contains 8 Imperial bushels, or 8½ U. S. bushels.

Grain is shipped from New York by the *Quarter* of 480 lb. (8 U. S. bu.), or by the *Ton* of 33⅓ U. S. bushels.

The bushel, *heap measure*, is the Winchester bushel, heaped in the form of a cone, not less than 6 inches high and 19½ inches in diameter, equal to the outside diameter of the standard bushel measure, and equal to 2747.715 cu. in.

Grain, seeds, and small fruits are sold by *stricken measure*, or the measure must be *even* full.

Corn in the ear, potatoes, coal, large fruits, coarse vegetables and other bulky articles, are sold by *heap measure.*

It is sufficiently accurate in practice to call 5 *stricken* measures equal to 4 *heaped* measures.

The value of many kinds of grain, seeds, fruit, and other articles, is often determined by weight instead of by bulk.

American coal is bought and sold, in large quantities, by the *ton;* in small quantities, by the *bushel.*

The liquid and dry measures of the same denomination are of different capacities. The *exact* and the *relative* size of each may be readily seen by the following

28. COMPARATIVE TABLE OF MEASURES OF CAPACITY.

	Cubic in. in one gallon.	Cubic in. in one quart.	Cubic in. in one pint.	Cubic in. in one gill.
Liquid measure	231	57¾	28⅞	7 7/32
Dry measure (½ pk.) . .	268⅘	67⅕	33⅗	8⅖

A cubic foot of pure water weighs 1000 oz , 62½ lb. Avoir.

29. COMPARISON OF GRAIN MEASURES.

Country.	Measure.	U. S. bush.	Country.	Measure.	U. S. bush.
England,	1 Bushel	= 1 031	Germany,	1 Schef.	= 1.5 to 3
France,	1 Hectoliter	= 2.84	Persia,	1 Artaba	= 1.85
Prussia,	1 Scheffel	= 1.56	Turkey,	1 Kiló	= 1.03
Austria,	1 Metze	= 1.75	Brazil,	1 Fan.	= 1.5
Russia,	1 Chetverik	= .74	Mexico,	1 Alque.	= 1.13
Greece,	1 Kailon	= 2.837	Madras,	1 Parah	= 1.743

ENGLISH MEASURES OF CAPACITY.

30. ***Wine Measure*** is used to measure wines and all liquids, except malt liquors and water.

TABLE.

4 Gills	= 1 Pint	*pt.*
2 Pints	= 1 Quart	*qt.*
4 Quarts	= 1 Gallon	*gal.*
10 Gallons	= 1 Anker	*ank.*
18 Gallons	= 1 Runlet	*run.*
42 Gallons	= 1 Tierce	*tier.*
2 Tierces	= 1 Puncheon	*pun.*
63 Gallons	= 1 Hogshead	*hhd.*
2 Hogsheads	= 1 Pipe	*pipe.*
2 Pipes	= 1 Tun	*tun.*

31. ***Ale and Beer Measure*** is used to measure all malt liquors and water.

TABLE.

2 Pints	= 1 Quart	*qt.*
4 Quarts	= 1 Gallon	*gal.*
9 Gallons	= 1 Firkin	*fir.*
18 Gallons	= 1 Kilderkin	*kil.*
36 Gallons	= 1 Barrel	*bar.*
1½ Bar. or 54 gal.	= 1 Hogshead	*hhd.*
2 Hogsheads	= 1 Butt	butt.
2 Butts	= 1 Tun	tun.

32. ***Corn or Dry Measure*** is used to measure all dry commodities not usually *heaped.*

TABLE.

2 Quarts	= 1 Pottle	*pot.*
2 Pottles	= 1 Gallon	*gal.*
2 Gallons	= 1 Peck	*pk.*
4 Pecks	= 1 Bushel	*bus.*
2 Bushels	= 1 Strike	*str.*
4 Bushels	= 1 Coomb	*coomb.*
2 Coombs or 8 bu.	= 1 Quarter	*qr.*
5 Quarters	= 1 Load	*load.*
2 Loads or 10 Qr.	= 1 Last	*last.*

14 Pounds = 1 Stone.
21½ Stones = 1 Pig of iron or lead.
8 Pigs = 1 Fother.

The *stone* varies. Legally it is 14 lb. A stone of butcher's meat or fish is reckoned at 8 lb.; of cheese, at 16 lb.; of hemp, at 32 lb.

A *pig* of iron or lead is 250 lb., and 8 pigs make a *fother.*

MEASURES OF WEIGHT.

33. ***Weight*** is the measure of the quantity of matter a body contains, determined by the force of gravity.

34. The ***Standard Unit*** of weight is the *Troy Pound* of the Mint, and contains 5760 grains.

TROY WEIGHT.

35. ***Troy Weight*** is used in weighing gold, silver, jewels, and in philosophical experiments.

TABLE.

24 Grains (*gr.*)	= 1 Pennyweight	*pwt.*	1 *lb.* =	5760 *gr.*
20 Pennyweights	= 1 Ounce	*oz.*		240 *pwt.*
12 Ounces	= 1 Pound	*lb.*		12 *oz.*

36. TABLE.

DIAMOND WEIGHT.

16 Parts = 1 Grain.
4 Grains = 1 Carat.
1 Carat = 3⅙ Troy gr., nearly.

ASSAYERS' WEIGHT.

1 Carat =10 pwts.
1 Carat gr. = 2 pwts. 12 gr. or 60 Troy gr.
24 Carats = 1 Troy lb.

The term *carat* is also used to express the *fineness* of gold, each carat meaning a *twenty-fourth* part.

APOTHECARIES' WEIGHT.

37. ***Apothecaries' Weight*** is used by apothecaries and physicians in compounding dry medicines.

TABLE.

20 Grains (*gr.* xx) = 1 Scruple . . . . *sc.*, or ℈.
3 Scruples (℈iij) = 1 Dram . . . . . *dr.*, or ʒ.
8 Drams (ʒ viij) = 1 Ounce . . . . *oz.*, or ℥.
12 Ounces (℥ xij) = 1 Pound . . . . *lb.*, or ℔.

℔ 1 = ℥ 12 = ʒ 96 = ℈ 288 = *gr.* 5760.

1. *Medicines* are bought and sold in quantities by Avoirdupois weight.

2. The pound, ounce and grain are the same as those of Troy weight, the ounce being *differently divided.*

AVOIRDUPOIS WEIGHT.

38. ***Avoirdupois Weight*** is used for all the ordinary purposes of weighing.

TABLE.

16 Ounces (*oz.*) = 1 Pound . . . *lb.*
100 Pounds = 1 Hundredweight *cwt.*
20 cwt., or 2000 lb. = 1 Ton . . . . T.

$$1\ T. = \begin{cases} 32000\ oz. \\ 2000\ lb. \\ 20\ cwt. \end{cases}$$

The ounce is often divided into *halves*, quarters, etc.

39. The *Long* or *Gross ton, hundred-weight,* and *quarter* were formerly in common use; but they are now seldom used except in estimating duties at the United States Custom-Houses, in freighting and wholesaling coal from the Pennsylvania mines.

LONG TON TABLE.

28 Pounds	= 1 Quarter . . .	*qr.*	1 *T.* =	2240 *lb.*
4 Qr., or 112 lb.	= 1 Hundredweight	*cwt.*		80 *qr.*
20 cwt. or 2240 lb.	= 1 Ton	*T.*		20 *cwt.*

40. The following denominations are also used:

100 Pounds of Grain or Flour	make	1 Cental.
100 Pounds of Dry Fish	"	1 Quintal.
100 Pounds of Nails	"	1 Keg.
196 Pounds of Flour	"	1 Barrel.
200 Pounds of Pork or Beef	"	1 Barrel.
280 Pounds	"	1 Barrel of Salt at the N. Y. Salt Works.

41. COMPARATIVE TABLE OF WEIGHTS.

	TROY.	APOTHECARIES.	AVOIRDUPOIS.
1 Pound	= 5760 Grains	= 5760 Grains	= 7000 Grains.
1 Ounce	= 480 "	= 480 "	= 437.5 "
	175 Pounds	= 175 Pounds	= 144 Pounds.

42. COMPARISON OF COMMERCIAL WEIGHTS.

Country.	Weight.	U. S. lbs. avdp.	Country.	Weight..	U. S. lbs. avdp.
France,	1 Kilogram	= 2.20	Prussia,	1 Zolpf'd	= 1.10
Germany,	1 Pfund	= 1.10	Netherlands,	1 Pond	= 2.20
Austria,	1 Pfund	= 1.23	East Indies,	1 Seer	= 2.06
Russia,	1 Funt	= .90	China,	1 Catty	= 1.33
Sweden,	1 Pund	= .93	Japan,	1 Kin	= .62
Denmark,	1 Pund	= 1.10	Mexico,	1 Libra	= 1.02
Turkey,	1 Oka	= 2.82	Brazil,	1 Arratel	= 1.02
Egypt,	1 Rottoli,	= 1.008	Spain,	1 Libra	= 1.016
Persia,	*1 Rattel,*	= 2.116	Sicily,	1 Libra	= .7
Madras	*1 Vis*	= 3.125	Arabia,	1 Maund	= 3

43. The weight of the *bushel* of certain grains, seeds and vegetables has been fixed by statute in many of the States ; and these statute weights must govern in buying and selling, unless specific agreements to the contrary be made.

TABLE OF AVOIRDUPOIS POUNDS IN A BUSHEL,
As prescribed by statute in the several States named.

COMMODITIES.	*California.*	*Connecticut.*	*Illinois.*	*Indiana.*	*Iowa.*	*Kentucky.*	*Louisiana.*	*Maine.*	*Massachusetts.*	*Michigan.*	*Minnesota.*	*Missouri.*	*New Jersey.*	*New York.*	*Ohio.*	*Oregon.*	*Pennsylvania.*	*Rhode Island.*	*Vermont.*	*Washington T.*	*Wisconsin.*
Barley	50		48	48	48	48	32		46	48	48	48	48	48	48	46	47		46	45	48
Beans			60	60	60	60						60		62							
Blue Grass Seed			14	14	14	14						14									
Buckwheat	40	45	40	50	52	52			46	42	42	52	50	48		42	48		46	42	42
Castor Beans			46	46	46							46									
Clover Seed			60	60	60	60				60	60	60	64	60	60	60				60	60
Dried Apples			24	25	24					28	28	24				28				28	28
Dried Peaches			33	33	33					28	28	33				28				28	28
Flax Seed			56	56	56	56						56	55	55	56						56
Hemp Seed			44	44	44	44						44									
Indian Corn	52	56	52	56	56	56	56		56	56	56	52	56	58	56	56	56		56	56	56
Indian Corn in ear			70	68	68																
Indian Corn Meal			48	50		50		50	50									50			
Oats	32	28	32	32	35	33⅓	32	30	32	32	32	35	30	32	32	34	32		32	36	32
Onions			57	48	57	57			52			57						50		50	
Potatoes		60	60	60	60	60		60				60	60	60		60		60	60	60	60
Rye	54	56	54	56	56	56	32		56	56	56	56	56	56	56	56	56		56	56	56
Rye Meal								50	50									50			
Salt				50	50	50						50		56							
Timothy Seed			45	45	45	45						45		44							46
Wheat	60	56	60	60	60	60	60		60	60	60	60	60	60	60	60	60		60	60	60
Wheat Bran			20		20	20						20									

In Pennsylvania 80 lbs. coarse, 70 lbs. ground, or 62 lbs. fine salt make 1 bushel ; and in Illinois, 50 lbs. common or 55 lbs. fine salt make 1 bushel.

In Maine 64 lbs. of ruta baga turnips or beets make 1 bushel.

A cask of lime is 240 lbs. Lime in slaking absorbs 2½ times its *volume, and 2¼ times* its weight in water.

44. The following table will assist farmers in making an accurate estimate of the amount of land in different fields under cultivation.

TABLE.

10	rods	×	16	rods	= 1	A.		220	feet	×	198	feet	= 1	A.
8	"	×	20	"	= 1	"		110	"	×	369	"	= 1	"
5	"	×	32	"	= 1	"		60	"	×	726	"	= 1	"
4	"	×	40	"	= 1	"		120	"	×	363	"	= 1	"
5	yds.	×	968	yds.	= 1	"		200	"	×	108.9	"	= ½	"
10	"	×	484	"	= 1	"		100	"	×	145.2	"	= ⅓	"
20	"	×	242	"	= 1	"		100	"	×	108.9	"	= ¼	"
40	"	×	121	"	= 1	"								

45. The following table will often be found convenient, taking *inside* dimensions:

A box 24 in. × 24 in. × 14.7 will contain *a barrel* of 31½ gallons.

A box 15 in. × 14 in. × 11 in. will contain 10 *gallons.*

A box 8¼ in. × 7 in. × 4 in. will contain *a gallon.*

A box 4 in. × 4 in. × 3.6 in. will contain *a quart.*

A box 24 in. × 28 in. × 16 in. will contain 5 *bushels.*

A box 16 in. × 12 in. × 11.2 in. will contain *a bushel.*

A box 12 in. × 11.2 in. × 8 in. will contain *a half-bushel.*

A box 7 in. × 6.4 in. × 12 in. will contain *a peck.*

A box 8.4 in. × 8 in. × 4 in. will contain *a half-peck* or 4 dry quarts.

A box 6 in. by $5\frac{3}{5}$ in., and 4 in. deep, will contain *a half-gallon.*

A box 4 in. by 4 in. and $2\frac{1}{10}$ in. deep, will contain *a pint.*

46. Nails are put up 100 pounds to the keg.

SIZE.	Length, inches.	Nails in a lb.	SIZE.	Length, inches.	Nails in a lb.	SIZE.	Length, inches.	Nails in a lb.
3*d* fine blued.	1⅛	725	30*d* com. blued.	4½	16	6*d* casing	2	210
3*d* com. "	1¼	400	40*d* " "	5	14	8*d* "	2½	134
4*d* " "	1½	300	50*d* " "	5½	11	10*d* "	3	78
6*d* " "	2	150	60*d* " "	6	8	6*d* finishing	2	317
8*d* " "	2½	85	6*d* fence.	2	80	8*d* "	2½	208
10*d* " "	3	60	8*d* "	2½	50	10*d* "	3	126
12*d* " "	3¼	50	10*d* "	3	30	6*d* clinching	2	118
16*d* " "	3½	40	12*d* "	3¼	27	8*d* "	2½	80
20*d* " "	4	20	16*d* "	3½	20	10*d* "	3	45

5 lbs. of 4d or 3¾ lbs. of 3d will put on 1,000 shingles.
5¾ lbs. of 3d fine will put on 1,000 lath.

MEASURES OF TIME.

47. ***Time*** is the measure of duration.

48. The ***Unit*** is the *mean solar day*.

TABLE.

60 Seconds (*sec.*) = 1 Minute . . *min.*
60 Minutes = 1 Hour . . . *hr.*
24 Hours = 1 Day . . . *da.*
7 Days = 1 Week . . *wk.*
365 Days, or
12 Calendar Mo. } = 1 Common Year *yr.*
366 Days = 1 Leap Year . *yr.*
100 Years = 1 Century . . *Cen.*

COMMON YEAR.
1 *Yr.* = { 525600 *min.*
8760 *hr.*
12 *mo.*
365 *da.*

1. Every year that is exactly divisible by 4 is a *leap* year, the centennial years excepted; the other years are *common* years.

2. Every centennial year that is divisible by 400 is a leap year.

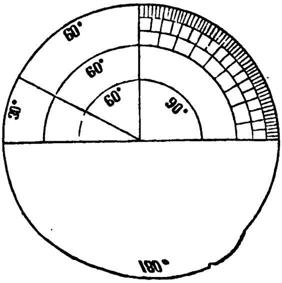
3. In most business transactions 30 days are called 1 month, and 12 months 1 year.

4. The *civil day* begins and ends at 12 o'clock, midnight. A. M. denotes the time before noon; M., at noon; and P. M., afternoon.

5. The *astronomical day*, used by astronomers in dating events, begins and ends at 12 o'clock, noon.

MEASURE OF ANGLES.

49. ***Circular*** or ***Angular Measure*** is used in measuring angles and arcs of circles, in determining latitude and longitude, the location of places, the motion of the heavenly bodies, etc.



50. The ***Unit*** is the *degree,* which is $\frac{1}{360}$ part of the circumference of any circle.

TABLE.

60 Seconds (″)	= 1 Minute .	′	1 *C.* =	1296000″.
60 Minutes	= 1 Degree .	°		21600′
30 Degrees	= 1 Sign . .	*S.*		360°
12 Signs, or 360°	= 1 Circle .	*C.*		12 *S.*

A ***Semi-Circumf'ce*** is *one-half* of a circumference, or 180°.

A ***Quadrant*** is *one-fourth* of a circumference, or 90°.

A ***Sextant*** is *one-sixth* of a circumference, or 60°.

A ***Sign*** is *one-twelfth* of a circumference, or 30°.

A ***Degree*** (1°) is *one-ninetieth* of a *right angle.*

The length of a degree varies with the size of the circle ; thus, a degree of longitude at the Equator is 69.16 statute miles, at 30° of latitude it is 59.81 miles, at 60° of latitude it is 34.53 miles, and at 90°, or the poles, it is nothing.

A *minute* of the earth's circumference is called a geographic mile.

LONGITUDE AND TIME.

51. Since the earth performs one complete revolution on its axis in a day or 24 hours, the sun *appears to pass* from east to west round the earth, or through 360° of *longitude,* once in every 24 hours of *time.* Hence the relation of time to the *real* motion of the earth or the *apparent* motion of the sun, is as follows :

TABLE.

For a difference of	There is a difference of
15° in Long.	1 hr. in Time.
15′ " "	1 min. " "
15″ " "	1 sec. " "
1° " "	4 min. " "
1′ " "	4 sec. " "
1″ " "	$\frac{1}{15}$ sec. " "

COUNTING.

52. This measure is used in counting certain classes of articles for market purposes.

TABLE.

12 Units	= 1 Dozen . . .	*doz.*	1 *G. gro.* =	1728 *units.*
12 Dozen	= 1 Gross . . .	*gro.*		144 *doz.*
12 Gross	= 1 Great Gross .	*G. gro.*		12 *gro.*
20 Units	= 1 Score . . .	*sc.*		

Two things of a kind are often called a *pair*, and *six* things a *set;* as a *pair* of horses, a *set* of chairs, etc.

PAPER.

53. The denominations of this table are used in the paper trade:

TABLE.

24 Sheets	= 1 Quire . .	*qr.*	1 *B.* =	4800 Sheets.
20 Quires	= 1 Ream . .	*rm.*		200 Quires.
2 Reams	= 1 Bundle . .	*bun.*		10 Reams.
5 Bundles	= 1 Bale . .	*B.*		5 Bundles.

Paper is bought at *wholesale* by the bale, bundle, and ream; and at *retail* by the ream, quire, and sheet.

Paper may be made to order of any size, but the greater part made up for sale is only of regular sizes. The names generally define the sizes. Writing and Drawing Papers differ in size from Printing Papers of the same name. English sizes differ from American. However, when English or French printing papers are made *for this country* they are of American sizes.

54. SIZE OF WRITING PAPERS.

FOLDED PAPERS.

	Inches.		Inches.
Billet Note	6 × 8	Letter.	10 × 16
Octavo Note	7 × 9	Commercial Letter .	11 × 17
Commercial Note . .	8 × 10	Packet Post. . . .	11½ × 18
Packet Note	9 × 11	Extra Packet Post .	11½ × 18½
Bath Note	8½ × 14	Foolscap.	12½ × 16

The dimensions given above are those in most general use. Some kinds occasionally vary a trifle.

55. FLAT PAPERS.

	Inches.		Inches.
Law Blank	13 × 16	Medium	18 × 23
Flat Cap	14 × 17	Royal	19 × 24
Crown	15 × 19	Super Royal . . .	20 × 28
Demy	16 × 21	Imperial	22 × 30
Folio Post	17 × 22	Elephant	22¼ × 27¾
Check Folio	17 × 24	Columbia	23 × 33¼
Double Cap	17 × 28	Atlas	26 × 33
Extra Size Folio . . .	19 × 23	Double Elephant . .	26 × 40

Extra Size Folio is sometimes 18 × 23 inches, and 19 × 24 inches. Imperial is sometimes 93 × 31 inches.

56. SIZE OF PRINTING PAPERS.

	Inches.		Inches.
Medium	19 × 24	Double Medium . . .	24 × 38
Royal	20 × 25	Double Royal	26 × 40
Super Royal	22 × 28	Double Super Royal .	28 × 42
Imperial	22 × 32	" " " .	29 × 43
Medium-and-half . .	24 × 30	Broad Twelves . . .	23 × 41
Small Double Medium .	24 × 36	Double Imperial . . .	32 × 46

Larger sizes and odd sizes are sometimes made, but are *not common.*

BOOKS.

57. The terms *folio, quarto, octavo, duodecimo,* etc., indicate the number of leaves into which a sheet of paper is folded.

When a sheet is folded into	The book is called	And 1 sheet of paper makes
2 leaves	a Folio,	4 pp. (pages).
4 "	a Quarto or 4to,	8 "
8 "	an Octavo or 8vo,	16 "
12 "	a Duodecimo or 12mo,	24 "
16 "	a 16mo,	32 "
18 "	an 18mo,	36 "
24 "	a 24mo,	48 "
32 "	a 32mo,	64 "

COPYING.

58. Clerks and copyists are often paid by the *folio* for making copies of legal papers, records, and documents.

72 words make 1 folio, or sheet of common law.
90 " 1 " chancery.

A folio varies in different States and countries, but usually contains from 75 to 100 words.

59. ROMAN LONG MEASURES.

	Inches.		Feet.	Inches.
Digit . . . . . . =	.72575	Cubit	1	5.406
Uncia (inch) . . =	.967	Passus	4	10.02
Pes (foot) . . . =	11.604	Mile (millarium)	4842	

60. JEWISH LONG MEASURES.

	Feet.		Feet.
Cubit . . . . =	1.824	Mile (4000 cubits) . . =	7296
Sabbath day's journey =	3648	Day's journey =	33.164 mi.

61. MISCELLANEOUS.

	Feet.		Feet.
Arabian foot . . . =	1.095	Hebrew foot . . . =	1.212
Babylonian foot . . =	1.140	" cubit . . . . =	1.817
Egyptian finger . . =	.06145	" sacred cubit . =	2.002

RAILROAD FREIGHT.

62. When convenient to weigh them, all goods are billed at *actual weight;* but ordinarily, the articles named below are billed, at the rates given in the following

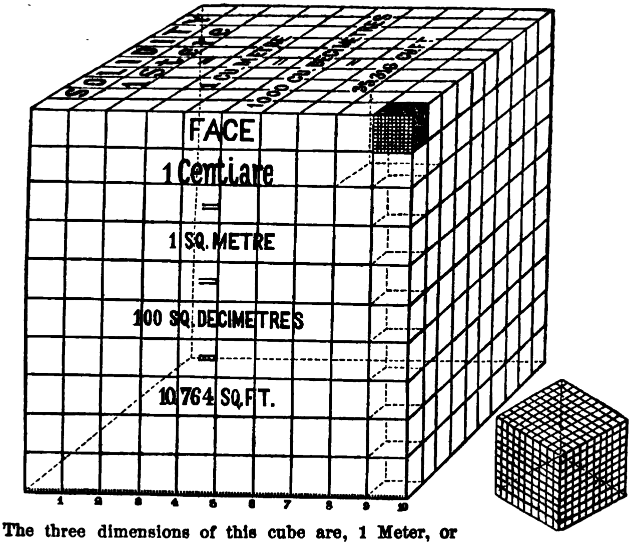
TABLE.

Ale or Beer,	820	lbs.	per bbl.	Highwines,	350	lbs.	per bbl.
Apples, green,	150	"	"	Lime,	200	"	"
Beef,	320	"	"	Nails,	108	"	per keg.
Barley,	48	"	per bu.	Oil,	400	"	per bbl.
Beans,	60	"	"	Oats,	32	"	per bu.
Cider,	350	"	per bbl.	Pork,	320	"	per bbl.
Corn Meal,	220	"	"	Potatoes, com'n,	150	"	"
Corn, shelled	56	"	per bu.	Salt, fine,	300	"	"
Corn in ear,	70	"	"	" coarse,	350	"	"
Clover Seed,	60	"	"	" in sacks,	200	"	per sack.
Eggs,	200	"	per bbl.	Wheat,	60	"	per bu.
Fish,	300	"	"	Whiskey,	350	"	per bbl.
Flour,	200	"	"	2000 pounds are reckoned 1 *ton.*			

Generally from 18000 to 20000 pounds is considered a car load.

Lumber and some other articles are estimated as follows:

	Weight.	Amount for car load.
PINE, HEMLOCK, and POPLAR, thoroughly seasoned, per thousand feet	3000	6500
BLACK WALNUT, ASH, MAPLE, and CHERRY, per thousand feet	4000	5000
PINE, HEMLOCK, and POPLAR, green, per M.	4000	5000
BLACK WALNUT, ASH, MAPLE, and CHERRY, green, per M.	4500	4000
OAK, HICKORY, and ELM, dry, per M.	4000	5000
OAK, HICKORY, and ELM, green, per M.	5000	4000
SHINGLES, green, per thousand	375	55 M.
LATH, per thousand	500	40 M.
BRICK, common, per car load	4 lbs. each.	5000
COAL, per car load		250 bu.
STONE, undressed, per cubic yard	4000	5 cu. yd.



The three dimensions of this cube are, 1 Meter, or 10 Decimeters, or 100 Centimeters, in length.
SCALE $\frac{1}{50}$ OF THE *Exact Size.*

1 Cu. Centimeter.
Exact Size.

METRIC SYSTEM.

63. The ***Metric System*** of weights and measures is based upon the *decimal scale.*

64. The ***Meter*** is the *base* of the system, and is the *one ten-millionth* part of the distance on the earth's surface from the equator to either pole, or 39.37079 inches.

65. From the *Meter* are made the *Are* (air), the *Stere* (stair), the *Liter* (leeter), and the *Gram;* these constitute the *primary* or *principal* units of the system from which all the others are derived.

66. The ***Multiple Units,*** or higher denominations, are named by prefixing to the name of the *primary* units the Greek numerals, *Deka* (10), *Hecto* (100), *Kilo* (1000), and *Myra* (10000).

67. The ***Sub-multiple Units,*** or lower denominations, are named by prefixing to the names of the *primary* units the Latin numerals, *Deci* ($\frac{1}{10}$), *Centi* ($\frac{1}{100}$), *Mille* ($\frac{1}{1000}$).

Hence, it is apparent from the *name* of a unit, whether it is *greater* or *less* than the standard unit, and also *how many times.*

MEASURES OF EXTENSION.

68. The ***Meter*** is the *unit of length,* and is equal to 39.37 inches nearly.

TABLE.

Metric Denominations.					U. S. Value.
			1 Millimeter	=	.03937079 in.
10 Millimeters,	*mm.*	=	1 Centimeter	=	.3937079 in.
10 Centimeters,	*cm.*	=	1 Decimeter	=	3.937079 in.
10 Decimeters,	*dm.*	=	1 ***Meter***	=	39.37079 in.
10 METERS,	*M.*	=	1 Dekameter	=	32.808992 ft.
10 Dekameters,	*Dm.*	=	1 Hectometer	=	19.927817 rd.
10 Hectometers,	*Hm.*	=	1 Kilometer	=	.6213824 mi.
10 Kilometers,	*Km.*	=	1 Myriameter (*Mm*)	=	6.213824 mi.

The ***Meter,*** like our yard, is used in measuring cloths and short distances.

The ***Kilometer*** is commonly used for measuring long distances, *and is about $\frac{5}{8}$ of a* common mile.

69. The ***Are*** is the *unit of land measure,* and is a square whose side is 10 meters, equal to a *square dekameter,* or 119.6 sq. yards.

TABLE.

1 Centiare,	*ca.*	= (1 Sq. Meter)	=	1.196034 sq. yd.
100 Centiares	"	= 1 *Are*	=	119.6034 sq. yd.
100 Ares	*A*	= 1 Hectare (*Ha.*)	=	2.47114 acres.

70. The ***Square Meter*** is the *unit* for measuring ordinary surfaces; as flooring, ceilings, etc.

TABLE.

100 Sq. Millimeters,	*sq. mm.*	=1 Sq. Centimeter	=	.155+sq. in.
100 Sq. Centimeters,	*sq. cm.*	=1 Sq. Decimeter	=	15.5+sq. in.
100 Sq. Decimeters,	*sq. dm.*	=1 ***Sq. Meter*** (*Sq.M.*)	=	1.196+sq yd.

71. The ***Stere*** is the *unit* of wood or solid measure, and is equal to a *cubic meter,* or .2759 cord.

TABLE.

		1 Decistere	=	3.531+cu. ft.
10 Decisteres,	*dst.*	= 1 ***Stere***	=	35.316+cu. ft.
10 Steres	*St.*	= 1 Dekastere (*DSt.*)	=	13.079+cu. yd.

72. The ***Cubic Meter*** is the *unit* for measuring ordinary solids; as excavations, embankments, etc.

TABLE.

1000 Cu. Millimeters,	*cu. mm*	= 1 Cu. Centimeter	=	.061+cu. in.
1000 Cu. Centimeters,	*cu. cm.*	= 1 Cu. Decimeter	=	61.026+ " "
1000 Cu. Decimeters,	*cu. dm.*	= 1 **Cu. Meter**	=	35.316+cu. ft.

MEASURES OF CAPACITY.

73. The ***Liter*** is the ***unit of capacity***, both of Liquid and of Dry Measures, and is a vessel whose volume is equal to a cube whose edge is *one-tenth* of a *meter*, equal to 1.05673 qt. Liquid Measure, and .9081 qt. Dry Measure.

TABLE.

10 Milliliters, *ml.* . . . = 1 Centiliter.
10 Centiliters, *cl.* . . . = 1 Deciliter.
10 Deciliters, *dl.* . . . = 1 ***Liter.***
10 LITERS, *L.* . . . = 1 Dekaliter.
10 Dekaliters, *Dl.* . . . = 1 Hectoliter.
10 Hectoliters, *Hl.* . . . = 1 Kiloliter, or Stere.
10 Kiloliters, *Kl.* . . . = 1 Myrialiter (*Ml.*).

The ***Hectoliter*** is the *unit* in measuring liquids, grain, fruit, and roots in large quantities.

74. EQUIVALENTS IN UNITED STATES MEASURES.

Metric Denominations.	Cubic Measure.	Dry Measure.	Wine Measure.
1 Myrialiter	= 10 Cubic Meters	= 283.72 + bu.	= 2641.4 + gal.
1 Kiloliter	= 1 Cubic Meter	= 28.372 + bu.	= 264.17 gal.
1 Hectoliter	= $\frac{1}{10}$ Cubic Meter	= 2.8372 + bu.	= 26.417 gal.
1 Dekaliter	= 10 Cu. Decimeters	= 9.08 quarts	= 2.6417 gal.
1 ***Liter***	= 1 Cu. Decimeter	= .908 quart	= 1.0567 qt.
1 Deciliter	= $\frac{1}{10}$ Cu. Decimeter	= 6.1022 cu. in.	= .845 gill.
1 Centiliter	= 10 Cu. Centimeters	= .6102 cu. in.	= .338 fluid oz.
1 Milliliter	= 1 Cu. Centimeter	= .061 cu. in.	= .27 fluid dr.

MEASURES OF WEIGHT.

75. The ***Gram*** is the *unit of weight*, and equal to the weight of a cube of distilled water, the edge of which *is one-hundredth of a meter*, equal to 15.432 Troy grains.

TABLE.

10 Milligrams,	*mg.*	=1 Centigram	=	.15432 + gr.	Troy
10 Centigrams,	*cg.*	=1 Decigram	=	1.54324 + “	“
10 Decigrams,	*dg.*	=1 ***Gram***	=	15.43248 + “	“
10 GRAMS,	*G.*	=1 Dekagram	=	.35273 + oz	Avoir.
10 Dekagram,	*Dg.*	=1 Hectogram	=	3.52739 + “	“
10 Hectograms,	*Hg.*	=1 { Kilogram, or, ***Kilo*** }	=	2.20462 + lb.	“
10 Kilograms,	*Kg.*	=1 Myriagram	=	22.04621 + “	“
10 Myriagrams, or, 100 Kilograms	*Mg.*	=1 Quintal	=	220.46212 + “	“
10 Quintals, or 1000 KILOS		=1 { Tonneau, or ***Ton*** }	=	2204.62125 “	“

The ***Kilogram,*** or ***Kilo,*** is the *unit* of common weight in trade and is a trifle less than 2⅕ lb. Avoirdupois.

The ***Tonneau*** is used for weighing very heavy articles, and is about 204 lb. more than a common ton.

76. ***Units*** of the *Common* System may be readily changed to *units* of the *Metric* System by the aid of the following

TABLE.

1 Inch	= 2.54 Centimeters.	1 Cu. inch	= 16.39 Cu. Centimet.
1 Foot	= 30.48 Centimeters.	1 Cu. foot.	= 28320 Cu. Centimet.
1 Yard	= .9144 Meter.	1 Cu. yard	= .7646 Cu. Meter.
1 Rod	= 5.029 Meters.	1 Cord	= 3.625 Steres.
1 Mile	= 1.6093 Kilometers.	1 Fl. ounce	= 2.958 Centiliters.
1 Sq. inch	= 6.4528 Sq. Centimet.	1 Gallon	= 3.786 Liters.
1 Sq. foot	= 929 Sq. Centimeters.	1 Bushel	= .3524 Hectoliter
1 Sq. yard	= .8361 Sq. Meter.	1 Troy gr.	= 64.8 Milligrams.
1 Sq. rod	= 25.29 Centiares.	1 Troy lb.	= .373 Kilo.
1 Acre	= 40.47 Ares.	1 Av. lb.	= .4536 Kilo.
1 Sq. mile	*= 259* Hectares.	1 Ton	= .907 Tonneau.

MEASURES OF VALUE.

77. ***Money*** is the measure of the *value* of things or of services, and the medium of exchange in trade.

UNITED STATES MONEY.

78. ***United States Money*** is the legal currency of the United States.

79. The ***Unit*** of United States Money is the *Gold Dollar.*

TABLE.

10 Mills (*m.*)	= 1 Cent . . *ct.*	1 *E.* =	10000	*m.*
10 Cents	= 1 Dime . . *d.*		1000	*ct.*
10 Dimes	= 1 Dollar . $.		100	*d.*
10 Dollars	= 1 Eagle . E.		10	$.

80. The legal ***Coin*** of the United States consists of *gold, silver, nickel,* and *bronze,* and is as follows:

81. ***Gold.*** The double-eagle, eagle, half-eagle, quarter-eagle, three-dollar, and one-dollar pieces.

82. ***Silver.*** The dollar, half-dollar, quarter-dollar, the twenty-cent, and the ten-cent pieces.

83. ***Nickel.*** The five-cent, and three-cent pieces.

84. ***Bronze.*** The one-cent piece.

1. The half-dime and three-cent pieces, the bronze two-cent, and *the nickel one-cent pieces* are no longer coined.

2. The *Trade-dollar* is designed solely for purposes of commerce and not for currency. The weight is 420 grains.

3. The *Standard Purity* of the *gold* and *silver* coins is .9 pure metal, and .1 alloy. The alloy of *gold* coins is *silver* and *copper;* the silver, by law, not to exceed $\frac{1}{10}$ of the whole alloy. The alloy of *silver* coins is *pure copper.*

4. The *five-cent* and *three-cent* pieces are composed of $\frac{3}{4}$ copper and $\frac{1}{4}$ nickel. The *cent* is composed of 95 parts of copper and 5 parts of tin and zinc.

CANADA MONEY.

85. ***Canada Money*** is the legal currency of the *Dominion* of Canada. The denominations are *dollars, cents,* and *mills,* and have the same *nominal* value as the corresponding denominations of U. S. Money.

The Currency of the Dominion of Canada was made *uniform* July 1st, 1871. Previous to 1858 sterling money was in use.

86. The ***Coin*** of the Dominion of Canada is *silver* and *bronze.*

87. The ***Silver Coins*** are the fifty-cent, twenty-five-cent, ten-cent, and five-cent pieces.

88. The ***Bronze Coin*** is the one-cent piece.

The *standard* silver coins consist of 925 parts (.925) pure silver and 75 parts (.075) copper. That is, they are .925 fine.

1. The *gold coin* used in Canada is the British *Sovereign,* worth 4.86\frac{2}{3}$, and the *Half-Sovereign.*

2. The intrinsic value of the 50-cent piece in United States money is about 46$\frac{1}{5}$ cents, of the 25-cent piece 23$\frac{1}{10}$ cents. In *ordinary business transactions,* they pass the same as U. S. States coin.

ENGLISH MONEY.

89. ***English*** or ***Sterling Money*** is the legal currency of Great Britain.

90. The ***Unit*** of English Money is the *Sovereign*, or *Pound Sterling.*

The value of a *Sovereign* in United States Money is $4.8665.

Table.

				U. S. Value.
4 Farthings (*far.*)	=	1 Penny	*d.*	.02027+.
12 Pence	=	1 Shilling . . .	*s.*	.2433+.
20 Shillings	=	1 Sovereign, or . 1 Pound	*sov.* £.	4.8665.

Other Denominations.

				U. S. Value.
2 Shillings (*s.*)	=	1 Florin . . .	*fl.*	$.48665.
5 Shillings	=	1 Crown . . .	*cr.*	1.2166¼.

91. The ***Coin*** of Great Britain in *general use* consists of *gold*, *silver*, and *copper*, as follows :

92. ***Gold.*** The sovereign, and half-sovereign.

93. ***Silver.*** The crown, half-crown, florin, shilling, six-penny, and three-penny piece.

94. ***Copper.*** The penny, half-penny, and farthing.

he *standard* gold coin contains 11 parts pure gold part alloy; silver coin 37 parts pure silver and 3 *lloy.*

FRENCH MONEY.

95. *French Money* is the legal currency of France, and is *decimal.*

The Franc of the Republic.

96. The ***Unit*** of French Money is the *Silver Franc.*

The Franc of the Empire.

The value of a *Franc* in United States Money is $.193.

Table.

10 Millimes (*m.*)	= 1 Centime	*ct.*	1 *Nap.* =	2000 *m.*
10 Centimes	= 1 Decime	*dc.*		2000 *ct.*
10 Decimes	= 1 Franc	*fr.*		200 *dc.*
20 Francs	= 1 Napoleon	*Nap.*		20 *fr.*

97. The ***Coin*** of France consists of *gold, silver,* and *bronze,* as follows :

98. *Gold.* The 100, 40, 20, 10, and 5 franc pieces.

99. *Silver.* The 5, 2, and 1 franc, the 50 and the 25 centime pieces.

100. *Bronze.* The 10, 5, 2 and 1 centime pieces.

The *standard* gold and silver coins contain 9 parts of *pure metal* and 1 part of *alloy.*

The U. S. Congress, by the Act of 1873, fixed the weight of the silver *half-dollar* at 12½ metrical grammes, so that 2 *half-dollars* are *precisely equivalent* in value to the 5 *franc* silver coin of Europe.

GERMAN MONEY.

101. The ***New Empire of Germany*** has adopted a new and uniform system of coinage.

102. The ***Unit*** of this new German System of Coinage is the *Reichsmark.*

The value of a Reichsmark ("*Mark*") in U. S. Money is $.238.

A pound of gold .900 fine is divided into $139\frac{1}{2}$ pieces, and the $\frac{1}{10}$ part of this gold coin is called a "Mark," and this is subdivided into 100 pennies (*Pfennige*).

The Coin of the New Empire consists of *gold, silver* and *nickel,* and is as follows:

Gold. The 20, 10, and 5 mark pieces.

Silver. The 2, and 1 mark, and the 20-penny pieces.

Nickel. The 10, and the 5-penny, and pieces of less valuation.

The 10-mark piece (*gold*) is equal to $3\frac{1}{8}$ P. Thalers (old).

The 1-mark (*silver*) is equal to 10 S. Groschen, or 1000 pennies.

The 20-penny (*silver*) is equal to 2 S. Groschen, or $\frac{1}{5}$ of a mark.

The 10-penny (*nickel*) is equal to 1 S. Groschen, or $\frac{1}{10}$ of a mark.

JAPAN MONEY.

103. ***Japan*** has a new and *decimal* system of coinage.

The ***unit*** of Japan money is the gold *Yen,* valued at $.997 U. S. money.

The ***Coin*** of Japan embraces *five gold* coins, valued at $20, $10, $5, $2, and $1. Also *five silver* coins, valued at 5, 10, 20, 50, and 100 cents, respectively.

The weight of the new trade dollar is 420 gr., and .9 pure silver.

104. U. S. Bonds are of two kinds; viz., those which are payable at a fixed date, and those which, while payable at a fixed date, may be paid at an earlier specified time, according as the government may elect.

1. The former are quoted in commercial transactions by the rate of interest which they bear; thus, United States bonds bearing 6% interest are quoted *U. S. 6's.* The latter are quoted in commercial transactions by a combination of the two dates; thus, *U. S. 5-20's,* or *U. S. 6's 5-20,* mean bonds of U. S., bearing 6% interest, and payable in 5 or 20 years, as the Government may choose.

2. When it is necessary to distinguish different issues bearing the same rate of interest, the year at which they become due is also mentioned; thus, *U. S. 5's of '71; U. S. 5's of '74; U. S. 6's, 5-20, of '84; U. S. 6's, 5-20, of '85.*

3. The 5-20's were issued in 1862, '64, '65, '67, and '70. They bear interest at 6%, paid semi-annually in gold, except the issue of 1870, called 5's of '81, which bear int. at 5%, paid quarterly in gold.

GOLD VALUES OF THE PAPER DOLLAR.

105. *Take the current gold quotation, in the left-hand column, and in the top line. The required value is at the point of intersection in the table:*

GOLD.		⅛	¼	⅜	½	⅝	¾	⅞
100..........	100	99⅞	99¾	99⅝	99½	99⅜	99¼	99⅛
101..........	99	98⅞	98¾	98⅝	98½	98⅜	98¼	98⅛
102..........	98	97⅞	97¾	97⅝	97½	97½	97⅜	97¼
103..........	97⅛	97	96⅞	96¾	96⅝	96½	96⅜	96¼
104..........	96⅛	96	95⅞	95¾	95⅝	95⅝	95½	95⅜
105..........	95¼	95⅛	95	94⅞	94¾	94⅝	94⅝	94½
106..........	94⅜	94¼	94⅛	94	93⅞	93¾	93⅝	93⅝
107..........	93½	93⅜	93¼	93⅛	93	92⅞	92¾	92¾
108..........	92⅝	92½	92⅜	92¼	92⅛	92	92	91⅞
109..........	91¾	91⅝	91½	91⅜	91⅜	91¼	91⅛	91
110..........	90⅞	90¾	90¾	90⅝	90½	90⅜	90¼	90¼
111..........	90⅛	90	89⅞	89¾	89¾	89⅝	89½	89⅜
112..........	89¼	89¼	89⅛	89	88⅞	88¾	88¾	88⅝
113..........	88½	88⅜	88¼	88¼	88⅛	88	87⅞	87⅞
114..........	87¾	87⅝	87½	87⅜	87⅜	87¼	87⅛	87
115..........	87	86⅞	86¾	86⅝	86⅝	86½	86⅜	86¼
116..........	86¼	86⅛	86	85⅞	85⅞	85¾	85⅝	85½
117..........	85½	85⅜	85¼	85¼	85⅛	85	84⅞	84⅞
118..........	84¾	84⅝	84⅝	84½	84⅜	84¼	84¼	84⅛
119..........	*84*	*84*	83⅞	83¾	83⅝	83⅝	83½	83⅜
120..........	*83⅜*	*83¼*	83⅛	83⅛	83	82⅞	82¾	82¾

106. *The values in United States money of the pure gold or silver representing respectively the monetary units and standard coins of foreign countries is shown in the following Table published by the Secretary of the Treasury, January* 1, 1875.

COUNTRY.	MONETARY UNIT.	STANDARD.	VALUE IN U. S. MONEY.	STANDARD COINS.
Argentine Republic	Peso fuerte	Gold	$1.00	None.
Austria	Florin	Silver	.45,8	Florin.
Belgium	Franc	Gold and silver	.19,3	5, 10, and 20 francs.
Bolivia	Dollar	Gold and silver	.96,5	Escudo, ½ bolivar, and bolivar.
Brazil	Milreis of 1000 reis	Gold	.54,5	None.
British Possessions in N. Am.	Dollar	Gold	1.00	
Bogota	Peso	Gold	.91,2	
Central America	Dollar	Silver	.91,8	Dollar.
Chili	Peso	Gold	.91,2	Condor, doubloon, and escudo.
Cuba	Peso	Gold	.92,5	
Denmark	Crown	Gold	.26,8	10 and 20 crowns.
Ecuador	Dollar	Silver	.91,8	Dollar.
Egypt	Pound of 106 piasters	Gold	4.97,4	5, 10, 25, and 50 piasters.
France	Franc	Gold and silver	.19,3	5, 10, and 20 francs.
Great Britain	Pound sterling	Gold	4.86,6½	½ sovereign and sovereign.
Greece	Drachma	Gold and silver	.19,3	5, 10, 20, 50, and 100 drachmas.
German Empire	Mark	Gold	.23.8	5, 10, and 20 marks.
Hayti	Dollar	Silver	.95,2	
Japan	Yen	Gold	.99,7	1, 2, 5, 10, and 20 yen.
India	Rupee of 16 annas	Silver	.43,6	
Italy	Lira	Gold and silver	.19,3	5, 10, 20, 50, and 100 lire.
Mexico	Dollar	Silver	.99,8	Peso or dollar, 5, 10, 25, and 50 centavo.
Netherlands	Florin	Silver	.38.5	½ florin, florin, and 2½ florins.
Norway	Crown	Gold	.26.8	10 and 20 crowns.
Peru	Dollar	Silver	.91,8	
Porto Rico	Peso	Gold	.92,5	
Portugal	Milreis of 1000 reis	Gold	1.08,4	2, 5, and 10 milreis.
Russia	Rouble of 100 copecks	Silver	.73,4	¼, ½, and 1 rouble.
Sandwich Islands	Dollar	Gold	1.00	
Spain	Peseta of 100 centimes	Gold and silver	.19,3	5, 10, 20, 50, and 100 pesetas.
Sweden	Crown	Gold	.26,8	10 and 20 crowns.
Switzerland	Franc	Gold and silver	.19,3	5, 10, and 20 francs.
Turkey	Piaster	Gold	.04,3	25, 50, 100, 250, and 500 piasters.
Uruguay	Patacon	Gold	.94,9	

107. *Weight, Fineness, and Value of Foreign* GOLD *Coins, as determined by United States Mint Assays.*

Country.	Denomination.	Weight.	Fineness.	Value in U.S. *gold* coin.		
		Ounces.	*Thous'dths.*	$	*cts.*	*m.*
Austria	Fourfold ducat	0.448	986	9	13	2
Do.	Souverain (no longer coined)	0.363	900	6	75	4
Do.	4 florins	0.104	900	1	93	5
Belgium	25 francs	0.254	899	4	72	0
Brazil	20 milreis	0.575	916,5	10	89	4
Centr'l America	2 escudos	0.209	853,5	3	68	8
Do. do.	4 reals	0.027	875	0	48	8
Chili	10 pesos (dollars)	0.492	898	9	13	6
Colombia and S. A. generally.	Old doubloon	0.867	870	15	50	3
Denmark	Old 10 thaler	0.427	895	7	90	0
Egypt	Bedidlik (100 piasters)	0.275	875	4	97	4
England	Pound or Sovereign (new)	0,256,8	916,5	4	86	5
Do.	Pound average (worn)	0,256,3	916,5	4	85	6
France	20 franc (no new issues)	0,207	899	3	84	7
Germany	Old 10 thaler (Prussian)	0.427	903	7	97	1
Greece	20 drachms	0.185	900	3	44	2
India (British).	Mohur, or 15 rupees	0.375	916,5	7	10	5
Italy	20 lire (francs)	0.207	899	3	84	7
Japan	Cobang (obsolete)	0.289	572	3	57	6
Do.	New 20 yen	1.072	900	19	94	4
Mexico	Old doubloon (average)	0.867	870	15	59	3
Do.	20 pesos (empire)	1.086	875	19	64	3
Do.	20 pesos (republic), new	1.081	873	19	51	5
Netherlands	10 guilders	0.215	899	3	99	7
New Granada	10 pesos (dollars)	0.525	891,5	9	67	5
Peru	20 soles	1.055	898	19	21	3
Portugal	Coroa (crown)	0.308	912	5	80	7
Russia	5 roubles	0.210	916	3	97	6
Spain	100 reales	0.268	896	4	96	4
Do.	80 reales	0.215	869,5	3	86	4
Do.	10 escudos	0.270,8	896	5	01	5
Sweden	Ducat	0.111	975	2	23	7
Do.	Carolin (10 francs)	0.104	900	1	93	5
Tunis	25 piasters	0.161	900	2	99	5
Turkey	100 piasters	0.231	915	4	37	0

1. Foreign *gold* coins, if converted into United States coins, are subject to a charge of *one-fifth* of *one per cent.*

2. For *silver* coins there is no fixed legal valuation, as compared with gold. The value of the silver coins January 1, 1874, was computed at the rate of 120 cents per ounce, 900 fine, payable in subsidiary silver coin, or 113 cents in gold.

TABLE FOR INVESTORS.

108. *The following Table shows the rate per cent. of Annual Income from Bonds bearing* 5, 6, 7, *or* 8 *per cent. interest, and costing from* 40 *to* 125.

Purchase Price.	5%.	6%.	7%.	8%.	Purchase Price.	5%.	6%.	7%.	8%.
40	12.50	15.00	17.50	20.00	83	6.02	7.22	8.43	9.63
41	12.20	14.64	17.08	19.52	84	5.95	7.14	8.33	9.52
42	11.90	14.28	16.66	19.04	85	5.88	7.05	8.23	9.41
43	11.63	13.95	16.28	18.61	86	5.81	6.97	8.13	9.30
44	11.36	13.63	15.90	18.18	87	5.74	6.89	8.04	9.19
45	11.11	13.32	15.56	17.78	88	5.68	6.81	7.94	9.09
46	10.86	13.04	15.21	17.39	89	5.61	6.74	7.86	8.98
47	10.63	12.77	14.90	17.02	90	5.55	6.66	7.77	8.88
48	10.41	12.50	14.53	16.66	91	5.49	6.59	7.69	8.79
49	10.20	12.25	14.29	16.33	92	5.43	6.52	7.60	8.69
50	10.00	12.00	14.00	16.00	93	5.37	6.45	7.52	8.60
51	9.80	11.76	13.72	15.68	94	5.31	6.38	7.44	8.51
52	9.61	11.53	13.46	15.38	95	5.26	6.31	7.36	8.42
53	9.43	11.32	13.20	15.09	96	5.20	6.25	7.29	8.33
54	9.25	11.11	12.96	14.81	97	5.15	6.18	7.21	8.24
55	9.09	10.90	12.72	14.54	98	5.10	6.12	7.14	8.16
56	8.92	10.70	12.50	14.28	99	5.05	6.06	7.07	8.08
57	8.77	10.52	12.27	14.03	100	5.00	6.00	7.00	8.00
58	8.62	10.34	12.06	13.79	101	4.95	5.94	6.93	7.92
59	8.47	10.16	11.86	13.55	102	4.90	5.88	6.86	7.84
60	8.33	10.00	11.66	13.33	103	4.85	5.82	6.79	7.76
61	8.19	9.83	11.47	13.11	104	4.80	5.76	6.72	7.69
62	8.06	9.67	11.29	12.90	105	4.76	5.71	6.66	7.61
63	7.93	9.52	11.11	12.69	106	4.71	5.66	6.60	7.54
64	7.81	9.37	10.93	12.50	107	4.67	5.60	6.54	7.47
65	7.69	9.23	10.76	12.30	108	4.62	5.55	6.48	7.40
66	7.57	9.09	10.60	12.12	109	4.58	5.50	6.42	7.33
67	7.46	8.95	10.44	11.94	110	4.54	5.45	6.36	7.27
68	7.35	8.82	10.29	11.76	111	4.50	5.40	6.30	7.20
69	7.24	8.69	10.14	11.59	112	4.46	5.35	6.25	7.14
70	7.14	8.57	10.00	11.43	113	4.42	5.30	6.19	7.07
71	7.04	8.45	9.85	11.26	114	4.38	5.26	6.14	7.01
72	6.94	8.33	9.72	11.11	115	4.35	5.21	6.08	6.95
73	6.84	8.21	9.58	10.95	116	4.31	5.17	6.03	6.89
74	6.75	8.10	9.45	10.80	117	4.27	5.12	5.98	6.83
75	6.63	8.00	9.33	10.66	118	4.23	5.08	5.93	6.77
76	6.57	7.89	9.21	10.52	119	4.20	5.04	5.88	6.72
77	6.49	7.79	9.00	10.38	120	4.16	5.00	5.83	6.66
78	6.41	7.69	8.97	10.25	121	4.13	4.95	5.78	6.61
79	6.32	7.59	8.86	10.12	122	4.09	4.91	5.73	6.55
80	6.25	7.50	8.75	10.00	123	4.06	4.87	5.69	6.50
81	*6.17*	*7.40*	*8.64*	9.87	124	4.03	4.83	5.65	6.45
82	*6.09*	*7.31*	*8.53*	9.75	125	4.00	4.80	5.60	6.40

109. *The following shows the manner in which quotations of foreign exchange are made in this country, and as quoted Jan. 2, 1875:*

		Sixty Days.	*Three Days.*
London	Prime Bankers' Sterl. Bills	4.85½ @ 4.86	4.90 @ 4.90½
Do.	Good do. do.	4.85 @ 4.85½	4.89½ @ 4.90
Do.	Prime Commercial do.	4.84 @ 4.85	4.88½ @ 4.89½
Paris	Francs	5.17½ @ 5.16¼	5.13¾ @ 5.12½
Antwerp	Francs	5.17½ @ 5.16¼	5.13¾ @ 5.12½
Switzerland	Francs	5.17½ @ 5.16¼	5.13¾ @ 5.12½
Amsterdam	Guilders	41⅛ @ 41¼	41½ @ 41⅝
Hamburg	Reichsmarks	94⅞ @ 95⅛	96 @ 96¼
Frankfort	Reichsmarks	94⅞ @ 95⅛	96 @ 96¼
Bremen	Reichsmarks	94⅞ @ 95⅛	96 @ 96¼
Berlin	Reichsmarks	94⅞ @ 95⅛	96 @ 96¼

In the above, "Prime Bankers' Bills" are those on the most reliable banking houses; "Good" is applied to those of somewhat inferior credit; and "Prime Commercial" are merchants' drafts, which usually command a less price in the market. The quotations in the ***first column*** are those of 60-day bills, and in the second column those of 3 days.

110. *Rates of Exchange at London, and on London.*

EXCHANGE AT LONDON, JAN. 2, 1875.			EXCHANGE ON LONDON.		
ON	TIME.	RATE.	DATE.	TIME.	RATE.
Amsterdam	short.	11.13½@11.16½	Jan. 2.	short.	11.82
Antwerp	....	25.47½@25 52¼	"	....	25.17
Hamburg	....	20.78 @20.82	"	3 mo.	20.25
Paris	short.	25.15 @25.25	"	short.	25.19
Paris	3 months.	25.47½@25.52½	....	....	....
Vienna	....	11.37½@11.42	Jan. 2.	3 mo.	110.50
Berlin	....	20.78 @20.82	"	short.	6.24¾
Frankfort	....	20.78 @20.82	"	....	119½
St. Petersburg	....	32½@ 32⅝	"	....	....
Cadiz	....	48⅛@ 48⅜	....	....	....
Lisbon	90 days.	52⅜@ 52⅝	....	....	....
Milan	3 months.	28.17½@28.22½	....	....	....
Genoa	....	28.17½@28.22½	....	....	....
Naples	....	28.17½@28.22½	....	....	....
New York	....	....	Dec. 31.	60 days.	$4 86
Rio de Janeiro	....	....	Dec. 17	90 days.	26⅜ @ 26½
Buenos Ayres	....	....	....	....	....
Valparaiso	....	....	....	....	....
Bombay	....	....	Dec. 31	6 mo.	1s. 10⅝d.
Calcutta	....	....	Dec. 29.	....	1s. 10$\frac{11}{16}$d.
Hong Kong	....	....	Dec. 24.	....	4s. 2¼d.
Shanghai	....	....	Dec. 25.	....	5s. 8¾d. @ 5s. 9d.
Alexandria	....	....	Dec. 30.	3 mo.	96¾

LEGAL INTEREST TABLE.

111. ***Legal Interest*** is the rate per cent. *established by law.*

112. ***Usury*** is a greater per cent. than the legal rate, and is *prohibited by law.*

Name of State.	Rate.		Name of State.	Rate.	
Alabama	8%	......	Minnesota	7%	12%
Arkansas*	6%	Any.	Mississippi	6%	10%
Arizona	10%	Any.	Missouri	6%	10%
California*	10%	Any.	Montana	10%	Any.
Connecticut	7%	Any.	New Hampshire	6%	......
Colorado*	10%	Any.	New Jersey	6%	.....
Canada	6%	......	New York	7%	......
Delaware	6%	......	North Carolina	6%	8%
Dist. Columbia	6%	10%	Nebraska	10%	12%
Dakota	10%	Any.	Nevada*	10%	Any.
Florida*	8%	Any.	Ohio	6%	8%
Georgia	7%	10%	Oregon	10%	12%
Illinois	6%	10%	Pennsylvania	6%	......
Indiana	6%	10%	Rhode Island*	6%	Any.
Iowa	6%	10%	South Carolina*	6%	Any.
Idaho	10%	8%	Tennessee	6%	10%
Kansas	7%	12%	Texas*	8%	Any.
Kentucky	6%	10%	Utah*	10%	Any.
Louisiana	5%	8%	Vermont	6%	......
Maine*	6%	Any.	Virginia	6%	12%
Maryland	6%	......	West Virginia	6%	......
Massachusetts*	6%	Any.	Wisconsin	7%	10%
Michigan	7%	10%	Washington Ter.*	10%	Any.

1. When the rate per cent. is not specified in accounts, notes, mortgages, contracts, etc., the *legal* rate is always understood.

2. In the above table, where *two* rates are specified, any rate above the lower, and not exceeding the higher, is allowed by law, *if stipulated in writing.*

3. In the States marked thus (*) the rate per cent. is unlimited if agreed upon by the parties in writing.

4. The above are liable to be changed at any time by the *Legislatures of the respective* States.

STATUTE LIMITATIONS.

113. A forced collection of debts cannot be made after a certain number of years specified in the statute of limitations of the different States named in the following Table :

Name of States.	Open account.	Notes.	Judgmt's.	Name of States.	Open account.	Notes.	Judgm'ts.
	Yrs.	*Yrs.*	*Yrs.*		*Yrs.*	*Yrs.*	*Yrs.*
Alabama	3	6	20	Minnesota	6	6	10
Arkansas	3	7	10	Mississippi	3	6	20
California	2	4	10	Missouri	5	10	20
Connecticut	6	6	17	New Hampshire	6	6	20
Colorado	2	4	5	New Jersey	6	16	20
Delaware	3	6	20	New York	6	6	20
Dist. of Columbia	3	3	12	North Carolina	3	3	10
Florida	5	5	......	Ohio	6	15	20
Georgia	3	3	12	Oregon	6	6	10
Illinois	5	6	16	Pennsylvania.	6	6	20
Indiana	6	20	20	Rhode Island	6	6	20
Iowa	5	10	20	South Carolina	6	6	20
Kentucky	2	7	14	Tennessee	6	6	10
Kansas	3	5	10	Texas	2	4	10
Louisiana	3	5	10	Utah	......	......	......
Maine	6	6	20	Vermont	6	6	6
Maryland	3	3	12	Virginia	5	5	10
Massachusetts	6	6	20	West Virginia	5	5	10
Michigan	6	6	20	Wisconsin	10	6	10

1. The above data are liable to a change at any time by the Legislatures of the States respectively.

2. In some of the above States there are exceptions and conditions.

LEGAL TENDER.

114. All *gold coins,* of United States coinage, are legal tender in payment of *all amounts.*

All *silver coins* are legal tender in sums not exceeding *five dollars,* in any one payment.

The *five-cent, three-cent,* and *one-cent* coins are legal tender at their nominal value, in sums not exceeding *twenty-five cents,* in any one payment.

"*Greenbacks*" are legal tender in payment of all debts public and private, except duties on imports, and interest *on the public* debt.

115. COMPOUND INTEREST TABLE.

Amount at the end of the year, of ONE DOLLAR PER ANNUM (*paid in advance*), *at* COMPOUND INTEREST *for any number of years.*

Yrs.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.
1	$1.03	$1.04	$1.05	$1.06	$1.07	$1.08
2	2.09	2.12	2.15	2.18	2.21	2.25
3	3.18	3.25	3.31	3.37	3.44	3.51
4	4.31	4.42	4.53	4.64	4.75	4.87
5	5.47	5.63	5.80	5.98	6.15	6.34
6	6.66	6.90	7.14	7.39	7.65	7.92
7	7.89	8.21	8.55	8.90	9.27	9.64
8	9.16	9.58	10.03	10.49	10.98	11.49
9	10.46	11.01	11.58	12.18	12.82	13.49
10	11.81	12.49	13.21	13.97	14.78	15.65
11	13.19	14.03	14.92	15.87	16.89	17.98
12	14.62	15.63	16.71	17.88	19.14	20.50
13	16.09	17.29	18.60	20.02	21.55	23.21
14	17.60	19.02	20.58	22.28	24.13	26.15
15	19.16	20.82	22.66	24.67	26.89	29.32
16	20.76	22.70	24.84	27.21	29.84	32.75
17	22.41	24.65	27.13	30.00	33.00	36.45
18	24.12	26.67	29.54	32.76	36.38	40.45
19	25.87	28.78	32.07	35.79	40.00	44.76
20	27.68	30.97	34.72	38.99	43.87	49.42
21	29.54	33.25	37.51	42.39	48.01	54.46
22	31.45	35.62	40.43	46.00	52.44	59.89
23	33.43	38.08	43.50	49.82	57.18	65.76
24	35.46	40.65	46.73	53.86	62.25	72.11
25	37.55	43.31	50.11	58.16	67.68	78.95
26	39.71	46.08	53.67	62.71	73.48	86.35
27	41.93	48.97	57.40	67.53	79.70	94.34
28	44.22	51.97	61.32	72.64	86.35	102.97
29	46.58	55.08	65.44	78.06	93.46	112.28
30	49.00	58.33	69.76	83.80	101.07	122.35
31	51.50	61.70	74.30	89.89	109.22	133.21
32	54.08	65.21	79.06	96.34	117.93	144.95
33	56.73	68.86	84.07	103.18	127.26	157.63
34	59.46	72.65	89.32	110.43	137.24	171.32
35	62.28	76.60	94.84	118.12	147.91	186.10
36	65.17	80.70	100.63	126.27	159.34	202.07
37	68.16	84.87	106.71	134.90	171.56	219.32
38	71.23	89.41	113.10	144.06	184.64	237.94
39	74.40	94.03	119.80	153.76	198.64	258.06
40	77.66	98.83	126.84	164.05	213.61	279.78
41	*81.02*	*103.82*	134.23	174.95	229.63	303.24
42	*84.48*	*109.01*	141.99	186.51	246.78	328.58
43	*88.05*	*114.41*	150.14	198.76	265.13	355.95

116. LATITUDE AND LONGITUDE OF PRINCIPAL PLACES ON THE GLOBE.

Compiled from the records of the U. S. Coast Survey and Topographical Engineer Corps, and the Imperial Gazetteer. Longitude reckoned from the Meridian of Greenwich.

Place.	Latitude.			Longitude.		
N. & S. AMERICA.		N.			W.	
Albany, N. Y ...	42°	39′	50″	73°	44′	49″
Ann Arb'r, Mich.	42	16	48	83	43	03
Annapolis, Md..	38	58	42	76	29	06
Augusta, Me....	44	18	43	69	50	
Austin, Texas...	30	13	30	97	39	
Baltimore, Md ..	30	17	48	76	36	39
Bangor, Me.....	44	48	20	68	45	42
Boston, Mass ...	42	21	30	71	03	30
Brooklyn Navy Yard, N. Y ...	40	42		73	58	30
Buffalo, N. Y....	42	50		78	59	
Burlington, Vt..	44	27		73	10	
		S.				
Buenos Ayres...	34	36	08	58	22	
		N.				
Cambr'ge, Mass.	42	22	48	71	07	40
Cape May, N. J.	38	55	48	74	57	18
		S.				
Cape Horn......	55	59		67	16	
		N.				
Charleston, S. C.	32	46	44	79	55	39
Chicago, Ill.....	41	53	48	87	37	47
Cincinnati, Ohio	39	05	54	84	29	31
Columbia, S. C..	33	59	57	81	01	54
Concord, N. H..	43	12	29	71	29	
Council Bluffs, Nebraska T...	41	30		95	48	
Des Moines. Io.	41	35		93	40	
Detroit, Mich...	42	19	46	83	2	23
Dover, Del......	39	10		75	30	
Dubuque, Iowa.	42	29	55	90	39	57
Fred'ksburg,Va.	38	18	6	77	27	17
Falls of St. Anthony, Minn ..	44	58	40	93	10	30
Fort Laramie, Wyoming T...	42	12	10	104	47	43
Ft.Leav'wth, Ks.	39	21	14	94	44	
Frankfort, Ky...	38	14		84	40	
Galveston, Tex..	29	18	17	94	46	59
Georgetown,Bermuda, W. I...	32	22	2	64	37	6
		S.				
Guayaquil	2	13		79	53	
		N.				
Havana	23	9		82	21	23
Halifax	44	39	4	63	35	
Harrisburg, Pa..	40	16		76	50	
Hartford, Conn..	*41*	*45*	*59*	72	40	45
Indianap'lis,Ind.	*39*	*55*		86	5	
N. & S. AMERICA.		N.			W.	
Jeffer'n City,Mo.	38°	36′		92°	8′	
Key West, Fla..	24	33		81	47	18″
		S.				
Lima...........	12	3		77	6	
		N.				
Little Rock, Ark.	34	40		92	12	
Louisville, Ky..	38	3		85	30	
Mexico, Mexico.	19	25	45″	99	5	6
Milwaukie, Wis.	43	2	24	87	54	4
Mobile, Ala	30	41	26	88	1	29
Montreal, C. E..	45	31		73	32	56
N. Haven, Conn	41	18	26	72	55	25
New Orleans, La.	29	57	46	90	2	30
New York, N. Y.	40	42	43	74		3
Ottawa, C. W...	45	23		75	42	4
Philadelphia, Pa.	39	56	53	75	8	42
Petersburg, Va..	37	13	47	77	23	55
Portland, Me....	43	39	28	70	14	53
Providence, R. I.	41	49	26	71	23	59
Quebec, C. E....	46	40	12	71	12	15
Richmond, Va ..	37	32	16	77	25	43
Rochester, N. Y.	43	8	17	77	51	
		S.				
Rio Janeiro.....	22	56		43	9	
		N.				
Savannah, Ga...	32	4	52	81	5	15
Sacramento, Cal.	38	34	41	121	27	44
St. August'e,Fla.	29	48	30	81	5	
St. Louis, Mo. ..	38	37	28	90	15	16
St. Paul, Minn..	44	52	46	95	4	54
Salt Lake City..	40	46	8	112	6	8
San Francisco...	37	47	36	122	46	48
Santa Fé,N.Mex.	35	41	6	106	1	22
Springfield, Ill..	39	48		89	33	
St. Joseph's, Mo.	23	3	13	109	40	44
Syracuse, N. Y..	43	3		76	9	16
Toronto, C. W..	43	30	35	79	23	21
Trenton, N. J...	40	13	10	74	45	30
Troy, N. Y......	42	43	44	73	40	41
Utica, N. Y.....	43	6	49	75	13	
		S.				
Valparaiso......	33	2		71	41	
		N.				
WASHINGTON ...	38	53	20	77	0	15
West Point.N.Y.	41	23	26	73	57	1
Wheeling,W.Va.	40	7		80	42	
Wilmington,Del.	34	14	3	77	56	47
Worcester Mass.	42	16	17	71	48	18
Yorktown, Va..	37	13		76	34	

117. LATITUDE AND LONGITUDE.

Place.	Latitude.			Longitude.		
EUROPE, ASIA, AFRICA, AND THE OCEANS.		N.			E.	
Antwerp	51°	13′		4°	24′	
Alexandria	31	12		29	53	
Archangel	64	32		40	33	
Athens	37	58		23	44	
Aleppo	36	11		37	10	
Algiers	36	47		3	4	
Amsterdam	52	22		4	53	
Borneo	5			115		
Botany Bay	34	2		151	13	
Barcelona	41	23		2	11	
Bombay	18	56		72	54	
Bremen	53	5		8	49	
Berlin	52	30	16″	13	23	45″
Brussels	50	51	10	4	22	
					W.	
Cape Clear	51	26		9	29	
					E.	
Calais	50	58		1	51	
Constantinople	41	1		28	59	
Canton	23	7		113	14	
Cronstadt	59	59		29	47	
Copenhagen	55	41		12	34	
		S.				
Cape of G. Hope	33	56	3	18	28	45
		N.			W.	
Cadiz	36	32		6	18	
					E.	
Calcutta	2	34		88	20	
Corinth	37	54		22	52	
Cairo	30	3		31	18	
Ceylon	9	49		80	23	
					W.	
Dublin	53	23	12	6	20	30
					E.	
Dover	51	8		1	19	
					W.	
Edinburgh	55	57		3	12	
		S.				
Falkland Islands	15	55		5	45	
					E.	
Feejee Group	17	41		178	53	
		N.				
Florence	43	46		11	16	
GREENWICH	51	28	38	......	..	
Geneva	46	11	59	6	9	15
					W.	
Glasgow	55	52		4	*16*	
Gibraltar	36	7		5	22	
					E.	
Genoa	44	24		8	53	
Honolulu	21	19		157	52	
		N.				
Hamburg	*53*	*33*		*9*	*58*	
Havre	*49*	*29*			*6*	

Place.	Latitude.			Longitude.		
EUROPE, ASIA, AFRICA, AND THE OCEANS.		N.			W.	
Jerusalem	31°	48′		37	20	
					W.	
Liverpool	53	24	47″	3		
					E.	
Leghorn	43	32		10	18	
Leipsic	51	20	20	12	22	
					W.	
Lisbon	38	42		9	9	
					E.	
Moscow	55	40		35	33	
Malta	35	54		14	30	
Messina	38	12		15	35	
Mocha	13	20		43	12	
Muscat	23	37		58	35	
Marseilles	43	18		5	22	
Manilla	14	36		121	2	
Madras	14	4	9	80	15	45″
					W.	
Madrid	40	25		3	42	
Malaga	36	43		4	26	
		S.			E.	
New Zealand	34	24		173	1	
New Hebrides	15	28		167	7	
		N.				
Niphon	34	36		138	50	35
Naples	40	50		14	16	
Odessa	46	28		30	44	
Pekin	30	54		116	28	
Palermo	38	8		13	22	
Paris	48	50	13	2	20	
Rome	41	54		12	27	
Rotterdam	51	54		4	29	
Smyrna	38	26		27	7	
Singapore	1	17		103	50	
Siam	14	55		100		
					W.	
Santa Cruz	28	28		16	16	
					S.	
Sierra Leone	8	30		13	18	
					E.	
St. Helena	15	55		32	34	
		N.				
Suez	29	59		5	45	
Stockholm	59	20	31	18	6	
St. Petersburgh	59	56		30	19	
Toulon	43	07		5	22	
Tripoli	34	54		13	11	
Tunis	36	47		10	6	
Tangier	35	47		5	54	
Venice	40	50		14	26	
Vienna	48	13		16	23	
Warsaw	52	13	5	21	2	9
		S.				
Zanzibar	6	28		39	33	

118. DIFFERENCE IN TIME BETWEEN N. Y. AND THE FOLLOWING PLACES.

F. *representing fast, and* S. *slow.*

Place.	New York.				Place.	New York.			
	hr.	*min.*	*sec.*			*hr.*	*min.*	*sec.*	
Albany, N. Y		1	1	S.	Jefferson City, Mo	1	12	32	S.
Augusta, Ga		41	31	"	Lima		12	24	"
Austin, Texas	1	34	36	"	Lisbon	4	19	24	F.
Baltimore, Md		10	27	"	Liverpool	4	44		"
Bangor, Me		20	57	F.	Little Rock, Ark	1	12	48	S.
Boston, Mass		11	46	"	Louisville, Ky		46		"
Berlin	5	49	35	"	Macon, Ga		38	30	"
Beaufort, N. C		10	38	S.	Madrid	4	41	52	F.
Buffalo, N. Y		19	56	"	Marseilles	5	17	28	"
Bombay	9	47	36	F.	Mexico	1	40	20	S.
Bremen	5	31	16	"	Milwaukie, Wis		55	36	"
Buenos Ayres	1	2	32	"	Mobile, Ala		56	6	"
Calcutta	10	49	20	"	Montreal, C. W		1	49	F.
Canton	12	28	56	"	Moscow	7	18	12	"
Cairo, Egypt	7	1	12	"	Naples	5	53	4	"
Cape Horn		36	56	"	Nashville, Tenn		51	16	S.
Chicago, Ill		54	31	S.	New Orleans, La	1	4	10	"
Cincinnati, Ohio		41	58	"	New Haven, Conn		4	18	F.
Charleston, S. C		23	43	"	Ottawa, C. W		6	48	S.
Cleveland, Ohio		31	24	"	Paris	5	5	20	F.
Concord, N. H		10	4	F.	Pekin	12	41	52	"
Cape of Good Hope	6	9	55	"	Palermo	5	49	28	"
Constantinople	6	51	56	"	Philadelphia, Pa		4	34	S.
Copenhagen	5	46	16	"	Prairie du Chien, Wis	1	8	34	"
Detroit, Mich		36	10	S.	Providence, R. I		10	24	F.
Dubuque, Iowa	1	6	40	"	Quebec, C. E		11	11	"
Dublin	4	30	38	F.	Rio Janeiro	2	3	24	"
Edinburgh	4	42	12	"	Rome	5	45	48	"
Florence	5	41	4	"	Richmond, Va		13	43	S.
Fort Leavenworth, Kans.	1	22	56	S.	Rochester, N. Y		15	24	"
Frankfort, Ky		42	40	"	Salt Lake City, U. T	2	32	24	"
Galveston, Texas	1	23	8	"	San Francisco, Cal	3	13	47	"
Genoa	5	31	32	F.	Santa Fé	2	8	5	"
Geneva	5	20	37	"	Sydney	5	9	32	"
Gibraltar	4	34	32	"	Suez	7	6	16	F.
Glasgow	4	38	56	"	St. Petersburg	6	57	16	"
GREENWICH	4	56		"	St. Helena	4	33		"
Halifax, N. B		41	40	"	St. Louis, Mo	1	5	1	S.
Harrisburg, Pa		11	20	S.	St. Paul, Minn	1	16	20	"
Havana, W. I		33	25	"	Tallahassee, Fla		42	24	"
Hamburg	5	35	52	F.	Toronto, C. W		21	33	"
Havre	4	55	36	"	Venice	5	53	4	F.
Indianapolis, Ind		48	20	S.	Vienna	6	1	32	"
Jackson, Miss	1		32	"	WASHINGTON, D. C		12	1	S.
Jeddo	14	16		F.	Wheeling, W. Va		26	48	"
Jerusalem	7	25	20	"					

SPECIFIC GRAVITIES.—WATER 1.

119. *A Table showing the weight of each substance compared with an equal volume of pure water. A cubic foot of rain-water weighs 1000 ounces, or 62½ lb. Avoir. To find the weight of a* CUBIC FOOT *of any substance named in the table, remove the decimal point three places toward the right, which is multiplying by 1000, and the result will show the number of ounces in a cubic foot.*

Substances.	Specific Grav.	Substances.	Specific Grav.
Acid, acetic	1.008	Lead, cast	11.350
“ nitric	1.271	“ white	7.235
“ sulphuric	1.841 to 2.125	“ ore	7.250
Air	.001227	Lignum vitæ	1.333
Alcohol, of commerce	.835	Lime	.804
“ pure	.794	“ stone	2.386
Alder wood	.800	Mahogany	1.063
Ale	1.035	Manganese	8.700
Alum	1.724	Maple	.750
Aluminum	2 560	Marble	2.716
Amber	1.064	Men (living)	.891
Amethyst	2.750	Mercury, pure	14.000
Ammonia	.875	Mica	2.750
Ash	.800	Milk	1.032
Blood, human	1.054	Nickel	8.279
Brass (about)	.800	Nitre	1.900
Brick	2.000	Oil, castor	.970
Butter	.942	“ linseed	.940
Cedar	.457 to .561	Opal	2.114
Cherry	.715	Opium	1.337
Cider	1.018	Pearl	2.510
Coal, bituminous (about)	1.250	Pewter	7.471
“ anthracite	1.500	Platinum (native)	17.000
Copper	8.788	“ wire	21.041
Coral	2.540	Poplar	.383
Cork	.240	Porcelain	2.385
Diamond	3.530	Quartz	2.500
Earth (mean of the globe)	5.210	Rosin	1.100
Elm	.671	Salt	2.130
Emerald	2.678	Sand	1.500 to 1.800
Fir	.550	Silver, cast	10.474
Glass, flint	2.760	“ coin	10.534
“ plate	2.760	Slate	2.110
Gold, native	15.600 to 19.500	Steel	7.816
“ pure, cast	19.258	Stone	2.000 to 2.700
“ coin	17.647	Sulphur, fused	1.990
Granite	2.652	Tallow	.941
Gum Arabic	1.452	Tar	1.015
Gypsum	2 288	Tin	7.291
Honey	1.456	Turpentine, spirits of	.870
Ice	.930	Vinegar	1.018
Iodine	4.948	Walnut	.671
Iron	7.645	Water, distilled	1 000
“ ore	4.900	“ sea	1.028
Ivory	1.917	Wax	.897
Lard	.947	Zinc, cast	7.190

120. SCRIPTURE LONG MEASURES.

		Eng. mi.	*Paces.*	*Feet.*	*Inches.*
A Palm	equals	0	0	0	3.648
A Span	"	0	0	0	10.944
A Fathom	"	0	0	7	3.552
Ezekiel's reed	"	0	0	10	11.328
An Arabian pole	"	0	0	14	7.104
A Furlong	"	0	145	4.6	.00
An Eastern mile	"	1	403	1.0	.00
A Day's Journey	"	33	172	4.0	.00

121. SCRIPTURE MEASURES OF CAPACITY.

LIQUID.				DRY.			
		gal.	*pints.*			*pecks.*	*pints.*
A Caph	=	0	.625	A Gachal	=	0	.1416
A Log	=	0	.833	A Kab	=	0	2.8333
A Kab	=	0	8.333	An Omer	=	0	5.1
A Hin	=	1	2	A Seah	=	1	1
A Seah	=	2	4	An Epah	=	3	3
A Bath or Ephah	=	7	4	A Letek	=	16	0
A Homer	=	75	5	A Homer	=	32	1

122. MONEY MENTIONED IN SCRIPTURE.

		£	*s.*	*d.*		$ *cts.*
A Talent (gold)	equal	5464	5	8	=	26592.809
A Talent (silver)	"	341	10	4	=	1662.0249
A Manch or Mina	"	5	13	10	=	27.6990
A Pound (Mina).	"	3	4	7	=	15.7151
A Shekel (gold)	"	1	16	5	=	8.8612
A Shekel (silver)	"	0	2	3	=	0.5474
A Golden Daric or Dram . . .	"	1	1	10	=	5.3127
A Piece of Silver (Stater) . . .	"	0	2	7	=	0.6285
Tribute Money (Didrachm) . .	"	0	1	3$\frac{1}{2}$	=	0.3142
A Bekah	"	0	1	1	=	0.2636
A Piece of Silver (Drachm) . .	"	0	0	7$\frac{3}{4}$	=	0.1571
A Penny (Denarius)	"	0	0	7$\frac{1}{2}$	=	0.1520
A Gerah	"	0	0	1	=	0.0202
A Farthing (Assarium)	"	0	0	0$\frac{3}{8}$	=	0.0076
A Mite	"	0	0	0$\frac{3}{32}$	=	0.0019

123. ABBREVIATIONS USED IN BUSINESS.

@	At.	Guar.	Guarantee.
% or Acc't	Account.	Gal.	Gallon.
Am't	Amount.	Hhds.	Hogsheads.
Ass'd	Assorted.	Ins.	Insurance.
Bal.	Balance.	Inst.	This month.
Bbl.	Barrel.	Invt.	Inventory.
Blk.	Black.	Int.	Interest.
B. L.	Bill of Lading.	Mdse.	Merchandise.
¢ or ct.	Cents.	Mo.	Month.
%	Per cent.	Net.	Without disc't.
Co.	Company.	No.	Number.
Cr.	Creditor.	Pay't	Payment.
Com.	Commission.	Pd.	Paid.
Cons't	Consignment.	Pk'gs	Packages.
Dft.	Draft.	Per	By.
Disc't	Discount.	Prem.	Premium.
Do.	The same.	Prox.	Next month.
Doz.	Dozen.	Ps.	Pieces.
Dr.	Debtor.	Rec'd	Received.
Ea.	Each.	Ship't	Shipment.
Exch.	Exchange.	Sund's	Sundries.
Exps.	Expenses.	S. S.	Steamship.
Fol.	Folio.	Ult.	Last month.
Fw'd	Forward.	Yd.	Yards.
Fr't	Freight.	Yr.	Year.

16 doz. $\frac{4}{\$10}, \frac{5}{\$12}, \frac{7}{\$15}$ = 16 doz., 4 of which are at $10 per doz., 5 @ $12, and 7 @ $15.

9 doz., $\frac{3}{4}$ @ 5/ $\frac{6}{5}$ @4/6. 3 doz. No. 4 @ 5 shillings per doz., and 6 doz. No. 5 @ 4 shillings sixpence per doz.

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☞ *A KEY to this* book of Problems has been prepared for the use of *teachers only.*

CHAPTER II.

THE following exercises and examples involve the combination and application of the principles and processes of the Fundamental Rules of Arithmetic and the Properties of Numbers.

Any class or pupil that has gone over the Elementary Rules, in regular course of any text-book on these subjects, should be prepared for test, drill, and review in the examples of this chapter.

MENTAL EXERCISES.

1. Begin with 1 and count to 47, by adding 2; thus, 1, 3, 5, 7, 9, 11, etc.

2. Begin with 2 and count to 71, by adding 3 successively.

3. Begin with 50 and count back to 0, by subtracting 2; thus, 50, 48, 46, 44, etc.

4. Begin with 67 and count back to 3, by subtracting 4 successively.

5. Count by 3's from 1 to 82; from 2 to 74; from 3 to 90, successively.

6. Count by 4's from 2 to 50, and back to 2; from 3 to 63, and back to 3; from 5 to 101, and back to 5.

7. Count by 5's from 3 to 93; from 4 to 104; from 5 to *150; from 6 to 96.*

8. Count by 5's from 2 to 72, and back to 2; from 4 to 89, and back to 4; from 7 to 107, and back to 7.

9. Count from 1 to 55 by repeating 2, 3, and 4; thus, 1, 3, 6, 10, 12, 15, 19, 21, 24, 28, etc.

10. Begin with 2 and count to 100 by repeating 2, 3, 4, and 5 successively.

11. Begin with 72 and count back to 0 by repeating the subtraction of 2, 3, and 4 successively; thus, 72, 70, 67, 63, 61, 58, 54, 52, 49, 45, etc.

12. Begin with 102 and count back to 4 by repeating the subtraction of 2, 3, 4, and 5 successively.

13. Begin with 0 and count to 81, and back to 0, by repeating the addition and subtraction of 2, 3, and 4.

14. Begin with 3 and count to 87, and back to 3, by repeating the addition and subtraction of 2, 3, 4, and 5 successively.

15. Begin with 4 and count to 102, and back to 4, by repeating the addition and subtraction of 2, 3, 4, and 5 successively.

16. What number must be put with 18 to make 40?

17. What number must be taken from 75 to leave 54?

18. The sum of two numbers is 63, and one of the numbers is 24; what is the other?

19. The difference of two numbers is 15, and the less number is 12; what is the greater?

20. The product of two numbers is 120, and one of the numbers is 24; what is the other?

21. If the quotient be 8 and the divisor 25, what is the dividend?

22. If the dividend be 144 and the quotient 12, what is the divisor?

23. Multiply 20 by 4, subtract 40, add 10, divide by 5, multiply by 7, and what is the result?

24. Subtract 10 from 6 multiplied by 8, to the remainder add 4, divide the sum by 6, multiply the quotient by 11, subtract 7 from the product, divide the remainder by 10, add 30 to the quotient, and what will be the sum?

25. Multiply 15 by 5, add 5, divide by 8, multiply by 6, subtract 10, divide by 5, add 2, multiply by 11, and what will be the product?

26. $10 + 8 \div 6 \times 9 - 7 \times 5 + 20 \div 10 + 8 =$ how many?

27. $8 \times 9 \div 12 + 3 \times 5 + 10 \div 11 \times 8 + 20 \div 12 + 4 \times 7 - 3 =$ how many?

28. $25 - 5 \div 2 \times 9 + 10 \div 20 \times 12 + 15 - 5 \div 7 + 8 + 2 =$ how many?

29. A number multiplied by 8, divided by 6, multiplied by 10, and the product increased by 5, equals 45; what is the number?

30. The product of two equal factors of a number divided by 3, the quotient increased by 20, and the result multiplied by 2, equals one-half of 128; what is the number, and what are the factors?

31. If 4 barrels of flour are worth $36, how many yards of cloth worth $3 a yard will 2 barrels of the flour buy?

32. When apples are worth $4 a barrel, and coal $8 a ton, how many barrels of apples will pay for 10 tons of coal?

33. A man sold a horse for $275, which was $47 more than it cost; what was the cost of the horse?

34. How many sets of factors in 24? in 48? in 60? in 125?

35. What are the prime factors of 30? of 45? of 60? of 75?

36. What are common divisors of 12, 48, and 60?

37. What is the greatest common divisor of 12, 48, 60, and 72?

38. Charles has 35 pennies, and James 50; how shall they arrange them in parcels, so that each boy shall have the same number in each parcel?

39. Name all the prime factors between 0 and 23.

40. What is the least number 7 and 8 will exactly divide?

41. What is the least common multiple of 9 and 12?

42. Resolve 144 into its prime factors. 105. 165. 210.

43. What is the least common multiple of 8, 12, and 16?

44. What is the smallest sum of money for which I could buy an exact number of books at $5, $3, and $4 each?

45. How many sheep can I buy for $75 at the rate of 3 for $7, and have $12 left?

46. If 4 bushels of wheat are worth 12 bushels of corn, how many bushels of corn are equal in value to 10 bushels of wheat?

47. Count by 6's from 0 to 84, and back to 0; from 3 to 99, and back to 3.

48. Count by 7's from 5 to 54, and back to 5; from 6 to 118, and back to 6.

49. Count by 8's from 1 to 101; from 2 to 114; from 4 to 124.

50. Count by 9's from 0 to 81, and back to 0; from 2 to 101, and back to 2.

51. Begin with 3 and count to 81 by repeating 6 and 7 successively.

52. Begin with 1 and count to 106, and back to 1, by repeating the addition and subtraction of 6, 7, and 8 successively.

53. Begin with 88 and count back to 3 by repeating the subtraction of 8 and 9 successively; 6, 7, 8, and 9 successively.

54. Begin with 0 and count to 90 by repeating the 9 digits successively, and back to 0 by repeated subtractions of the 9 digits in inverse order.

55. Begin with 1 and count to 137, and back to 1, using the 9 digits as in last example. Count from 2 to 182 and back to 2 in same way.

56. A man earns $90 a month; he pays $15 a month for house-rent, and $40 a month for other expenses; how much does he save in a year?

57. A farmer sold a grocer 15 bushels of potatoes at $1 a bushel, and bought 20 pounds of sugar at 15 cents a pound, and 10 pounds of coffee at 30 cents a pound; how many pounds of tea at 75 cents a pound could he buy for what was still due him?

58. A had $20, B had three times as much as A less $10, and C had $15 more than twice as much as A and B; how much had B and C?

59. What will be the rent of 12 acres of land if the rent of 25 acres is $100?

60. How many pounds of nails may be bought for 75 cents, at the rate of 4 pounds for 20 cents?

61. If a man receive 16 pounds of sugar in exchange for 20 pounds of cheese at 8 cents a pound, what is the price of the sugar per pound?

62. If a drover buy 24 lambs for $30, at how much must he sell them a head to gain $18?

63. If I buy turkeys at the rate of 5 for $3, and sell them at the rate of 8 for $7, how much will I gain by the operation?

64. If it costs $56 for bricks to build a cistern when bricks are worth $8 a thousand, what will it cost for bricks to build it when they are worth $10 a thousand?

65. A man engaged to labor 5 months for $80, but by request continued 3 months longer at the same rate; what amount was due him for the whole time?

66. Two vessels are 150 miles apart, and sail directly toward each other, one at the rate of 8 miles an hour, and the other at the rate of 12 miles an hour; how many hours before they will meet?

67. Four men agree to build 120 rods of wall for $48, and to share equally; but when the wall is half built 2 men quit and the others finish it: how many dollars must each receive?

68. Bought some oranges for 44 cents, at the rate of 5 for 11 cents, and divided them equally among 4 children; how many did each receive?

69. If 5 barrels of cider are worth $20, how many tons of hay, at $12 a ton, will 9 barrels of cider buy?

70. If a stage-coach run 72 miles in 12 hours, in how many hours will it run 96 miles?

71. How many dozen of eggs at 20 cents a dozen will pay for 18 pounds of sugar at 10 cents a pound?

72. At the rate of 12 miles in 3 hours, how far would a man travel in 10 hours?

73. Paid 60 cents for some lemons, at the rate of 6 for 10 cents, and sold them at the rate of 9 for 20 cents; how much was the gain?

WRITTEN EXAMPLES.

1. The area of the United States is 1,996,487 square miles; of the Territories, 1,042,000, and of Alaska, 577,390; how much greater is the area of the States than of the Territories and Alaska?

2. The Western and Atlantic Railroad of Georgia is 138 miles long. If the cost of building was $43,478 per mile, what was the cost of the entire road?

3. There are 31,173 verses in the Bible; how many verses must be read daily to read it through in a year of 365 days?

4. Two railway trains start at 8 A.M., one from Buffalo and the other from New York, 439 miles. Their average speed being 28 miles an hour, between what hours will they pass each other?

5. Queen Victoria was born in 1819, and the Prince of Wales in 1841. How old was each in 1871?

6. A man bequeathed his estate as follows: To each of his three sons, $8,500; to each of his four daughters, $4,250; to his wife, $350 more than the sum of the shares of one son and three daughters; and the remainder, which was $2,000 more than he gave to all his family, he left to benevolent institutions. What was the value of his estate?

7. Upper Canada contains 147,832, Lower Canada 209,990, Nova Scotia and Cape Breton 18,746, New Brunswick 27,620, Prince Edward's Island 2,173, Newfoundland 3,600, and Hudson's Bay Territory 2,436,000 square miles. By how much does the aggregate extent of these British North American provinces fall short of the total area of the United States and Territories, the latter being 3,615,877 square miles?

8. The earth's diameter at the equator is 7,925 miles. How long would it take a locomotive to travel that distance at the rate of 25 miles an hour?

9. The debt of the United States was largest Sept. 1, 1865, when it amounted to $2,757,689,571, less cash in the treasury; May 1, 1871, it was $2,303,573,543, less cash in the treasury. How much was the total decrease, and what the average per month?

10. North Carolina has 1,906 public schools. The apportionment of school money for 1870 was $155,290.56; what was the average per school?

11. The population of London in 1870 was 3,250,000; of New York, 944,129; and of Brooklyn, 396,300. How much greater was the population of London than of New York and Brooklyn?

12. The total length of railroads in Massachusetts Jan. 1st, 1864, was 1,941 miles, and the total cost of these roads and equipments up to the same date was $66,809,802. How much had been expended per mile?

13. A man invests in trade at one time $680; at another time $820; at a third time $1,580; and on a fourth occasion $420. How much must he add to the sum of these that the amount may be increased threefold?

14. The number of failures in the United States during 1870 was 3,351, involving liabilities of $88,242,000; what would be the average amount of each?

15. What number is that which, being divided by 24, the quotient increased by 25 + 1, the sum diminished by the difference between 40 and 27, the remainder multiplied by 4, and the product divided by 11, will give 12 for a quotient?

16. In 1864, there were in Massachusetts 112 miles of horse-railroads, costing for building and equipments $3,979,596. How much more had been expended per mile upon horse-railroads than upon steam-railroads?

17. The foreign immigration to this country for ten years, commencing with 1861 and ending with 1870 inclusive, was as follows:

1861	65,539	1866	233,418
1862	76,306	1867	242,731
1863	156,844	1868	213,606
1864	182,296	1869	358,989
1865	196,352	1870	211,190

What was the total, and what the average per year?

18. The product of three numbers is 535,500; one of the numbers is 68, and another 75. What is the third?

19. The total cost of the Atlantic Telegraph Cable, as originally made, was $1,258,250, of which 10 miles deep-sea cable was made at a cost of $1,450 per mile, and 25 miles shore-ends at $1,250 per mile; the cost of the remainder was $485 per mile. How many miles of cable were made?

20. If a house is worth $2,500, and the farm on which it stands 3 times as much, lacking $500, and the stock one-half as much as the house and farm, what is the value of the whole?

21. Texas has an area of 274,356 square miles, Massachusetts 7,800 square miles. How many States, each as large as Massachusetts, could be formed from Texas?

22. If Texas were divided into 5 equal States, how much larger than New York, which contains 47,000 square miles, would each of them be?

23. The area of Ireland is 32,481 square miles, and 5,023,984 acres are uncultivated. How many more acres are cultivated than 3 times the number uncultivated, there being 640 acres in one square mile?

24. The taxable cost *per capita* of the government of the city of New York in 1860 was $4, in 1870 it was $30. The population in 1860 was 805,658, in 1870 it was 944,129. How much did the cost in 1870 exceed that in 1860?

25. A man worth $12,750 received a legacy of $8,000; he spent $456 in traveling, and gave $1,000 to a college. How much money had he left?

26. In 1871 the United States contained 50,000 miles of railroad, the approximate cost of which was $2,000,000,000. The annual earnings have reached $400,000,000. What was the average cost per mile? what the average earnings per mile? at the same rate, in how many years would the earnings pay the cost of building?

27. A grocer bought 25 barrels of sugar at $25 a barrel, and 34 barrels at $22 a barrel. How much would he gain by selling the whole at $27 a barrel?

28. There is an island 40 miles in circumference. A and B commence traveling around it at the same time and place, but in different directions, A at the rate of 4 miles an hour, and B 5 miles. How far apart will they be at the end of 7 hours?

29. Divide $900 + \overline{(34+2) \times 5}$ by $(75 \div 5) + \overline{(4 \times 12) - 33}$.

30. West Virginia embraces 53 counties, in which there were, Oct. 1, 1863, 368,623 whites, 3,981 free colored persons, and 20,606 slaves. The total population in 1870 was 445,616. How much was the total increase?

31. Divide $450 + \overline{(24-12) \times 5}$ by $(90 \div 6) + \overline{(3 \times 11) - 18}$.

32. A drover bought cattle for $19,800, and sold a certain number of them for $15,360, at $96 per head, gaining thereby $960. How much did he gain per head, and how many cattle did he buy?

33. The population of ten of the largest cities in the United States was as follows:

Cities.	1870.	1860.	Cities.	1870.	1860.
New York	944,129	805,658	Baltimore	267,354	212,418
Philadelphia	674,022	565,529	Boston	250,526	177,840
Brooklyn	396,300	266,661	Cincinnati	216,239	101,044
St. Louis	310,864	160,773	New Orleans	191,322	168,675
Chicago	298,983	109,260	San Francisco	149,482	56,802

What was the total increase of these ten cities in ten years?

34. How many miles has a railway conductor traveled who has gone over the road daily, Sundays excepted, for three years, between Louisville and Nashville, the distance being 185 miles?

35. The estimated area of Lake Superior is 32,000 square miles; Huron, 30,000; Michigan, 22,000; Great Bear, 14,000; Great Slave, 12,000; Winnipeg, 10,000; Erie, 9,600; Ontario, 6,300. The area of New England is 68,348 square miles, and of New York 47,000. Were these lakes united in one body, how much more surface would they cover than the whole of New England and New York?

36. A has $3,540 more than B, and $1,200 less than C, who has $20,600; D has as much as A and B together. How much has D?

37. Iron was discovered in Greece by the burning of Mount Ida, B.C. 1406; and the electro-magnetic telegraph was invented by Morse, A.D. 1832. What period of time elapsed between the two events?

38. A grocer bought 12 barrels of sugar at $16 per barrel, and 17 barrels at $13 per barrel; how much would he gain by selling the whole at $18 per barrel?

39. A farmer sold 300 bushels of wheat at $2 a bushel, corn and oats to the amount of $750; with the proceeds he bought 120 head of sheep at $3 a head, one pair of oxen for $90, and 25 acres of land for the remainder. How much did the land cost him per acre?

40. If a man receive $1,200 salary, and pay $364 for board, $275 for clothing, $150 for books, and $187 for other expenses, how much can he save in 5 years?

41. What is the product of $\overline{(14\times25)-(9\times36)+4324}\times\overline{(280-112)+(376+42)}\times4$?

42. A speculator gained $5,760, and afterwards lost $2,746; at another time he gained $3,575, and then lost $4,632. How much did his gains exceed his losses?

43. The number of 1 and 2 cent internal revenue stamps sold in 1863 was 70,036,697, the value of which was $1,146,738.69; the number of 3 to 20 cent stamps was 23,065,021, valued at $1,520,440.18; and of 25 to 40 cent stamps, 3,745,355, worth $1,009,039.65. Required the number and value of the stamps of these denominations.

44. A mechanic earns $75 a month, but his necessary expenses are $50 per month. How long will it take him to pay for a farm of 60 acres worth $40 an acre?

45. A grocer wishes to put 1,280 pounds of tea in 4 kinds of boxes, containing respectively 7, 9, 10, and 14 pounds, using the same number of boxes of each kind. How many boxes can he fill?

46. In 1860 the United States produced 1,860,000 gallons of wine, worth $2.50 per gallon. How many schoolhouses, worth $1,500 each, could be built with the proceeds?

47. The United States paid $61,000 for the site of the Custom-House at Richmond, Va., and contracted for the building for $110,000; the total expense to the Government June 1, 1861, was $252,016. How much did the cost exceed the price agreed upon?

48. A grocer wishes to put 840 pounds of tea into 3 kinds of boxes, containing respectively 5, 10, and 15 pounds, using the same number of boxes of each kind. How many boxes can he fill?

49. What number besides 472 will divide 251,104 without a remainder?

50. Of what number is 3,042 both divisor and quotient?

51. What must the number be which, divided by 453, will give the quotient 307, and the remainder 109?

52. A coal dealer paid $965 for some coal. He sold 160 tons for $5 a ton, when the remainder stood him in but $3 a ton. How many tons did he buy?

53. The receipts and expenditures of the United States Government for the year ending June 30, 1870, were as follows:

Sources.	Receipts.	Sources.	Expenditures.
Customs........	$194,538,374.44	Civil and miscellaneous purposes.	$69,234,017.16
Internal Revenue	185,128,859.37	War Department.	57,655,675.40
Lands...........	3,350,481.76	Navy Department.	21,780,229.87
Miscellaneous...	28,237,762.06	Indians and Pensions..........	31,748,140.32
		Int. on Public debt	129,235,498.00

How much was the surplus of receipts?

54. A dealer in horses gave $7,560 for a certain number, and sold a part of them for $3,825, at $85 each, and, by so doing, lost $5 a head; for how much a head must he sell the remainder, to gain $945 on the whole?

55. Bought a Western farm for $22,360, and after expending $1,720 in improvements upon it, I sold one-half of it for $15,480, at $18 per acre. How many acres of land did I purchase, and at what price per acre?

56. Mr. Smith rented a sugar orchard containing 1,500 trees, agreeing to assume all the necessary expenses in making sugar for one-half the quantity made; he made on an average 3 pounds to each tree, and sold his part of the first 3,000 pounds made for 25 cents a pound, and the remainder at 20 cents; he paid $60 for labor, $30 for team work, and burned 25 cords of wood worth $2 a cord. How much was his gain?

57. The sum of two numbers is 2,487, and the greater is 553 more than the less. What are the numbers?

58. A cistern containing 1,260 gallons has two pipes. By the first, 48 gallons run into the cistern every half hour; and by the second, 36 gallons run out in an hour. In how many hours will the cistern be filled?

59. From $340+(\overline{20-4}\times\overline{8+2})$ take $\overline{36\div 3}\times(\overline{28\times 6\div 19-5})$.

60. Find the greatest common divisor of 4,718, 6,951, and 8,876.

61. In 1866 Alsace had an area of 5,249 square miles, and a population of 1,638,546; Lorraine, 6,698 square miles and a population of 1,081,906. What was the average population to the square mile?

62. The Northern Pacific Railroad from Lake Superior to Puget Sound, as located, is 2,000 miles long. The estimated cost and equipment of the road, including interest, is $85,277,000. What will be the average cost per mile?

63. The land grant to the Northern Pacific Railroad by the United States is 50,000,000 acres. From data given in last example, what is the average number of acres to the mile? and at the Government price of $2 50 an acre, how much more per mile than the cost of building the road will the land be worth?

64. The cotton crop of several States in 1870, the number of acres cultivated, and bales produced, was as follows:

State.	Acres.	Bales.
North Carolina.	451,714	170,000
South Carolina.	601,764	220,000
Georgia.......	1,330,491	495,000
Florida........	140,909	50,000
Alabama......	1,437,272	510,000
Mississippi.....	1,644,512	725,000
Louisiana.....	920,700	495,000
Texas.........	900,937	465,000
Arkansas......	711,734	375,000
Tennessee.....	526,184	215,000

What was the total number of acres cultivated and bales produced?

65. If the average weight per bale was 445 pounds, and the average value 16 cents per pound, what was the total value of the above cotton crop?

66. Mr. Jones owned 40 shares of railroad stock worth $100 per share, 35 shares of stock in an oil company worth $25 a share, 50 shares of stock in a life insurance company worth $87 a share, and real estate enough to make his entire property worth $25,000; what was his real estate worth?

67. The area and population of the American continent in 1870 was as follows:

	Square Miles.	Inhabitants.
North America	8,637,167	50,931,242
South America	6,954,131	26,677,419
Central America	188,370	2,690,635
West Indies	93,810	4,065,945

The area and population of entire Asia, at the same time, was 17,112,526 square miles, with a population of 782,129,318. How many more square miles and inhabitants does Asia contain than the American continent?

68. How many more square miles and inhabitants in North, than in South America?

69. Europe, according to statistics of 1870, contained 3,860,253 square miles, and a population of 295,803,933. What is the comparative difference in area and population between Europe and North America?

70. Africa, at the same date, contained 11,556,663 square miles, and 192,523,536 inhabitants. By how much does the area and population of Africa exceed that of North America?

71. At the close of the year 1870, there were in the United States 1,627 National Banks with $436,478,000 capital, and 258 State Banks with $67,100,000 capital. What was the average amount of capital to each of the whole number of banks?

72. In 1870, the aggregate of deposits in the savings banks of New England and New York was $412,738,985, belonging to 1,441,532 depositors, of which $194,360,300 belonged to 651,474 depositors in the State of New York. What was the average amount belonging to each depositor in New England, and in New York?

73. How many pounds of sugar at 20 cents a pound must be given for 5 pieces of cotton cloth, containing 44 yards each, at 42 cents a yard?

74. A man bought 750 acres of land at $20 per acre; he sold at one time 325 acres at $23 per acre, at another time 260 acres at $25 per acre. At what price per acre must he sell the remainder to gain on his purchase $1,945?

75. $250 \times 6 \div \overline{(4 \times 16) \div (8 \times 2)} + \overline{(25 \times (8 \div 4))} =$ how many?

76. A and B invested $120 in lottery tickets, A paying $3 as often as B $5. C and D invested an equal sum, C paying $4 as often as D paid $6. They purchased tickets together, agreeing to share the prizes in proportion to the sums invested by each. The prizes amounted to $7,200. How much ought each to receive?

77. Divide 16 × 72 × 45 × 21 by 27 × 32 × 12 × 35.

78. Bought 60 yards of cloth at the rate of 2 yards for $5, and 80 yards more at the rate of 4 yards for $9; I immediately sold the whole at the rate of 5 yards for $14. How much did I gain?

79. A farmer bought an equal number of horses, sheep, and hogs for $9,600. He gave $108, $9, and $11 per head for them respectively. What was the number of animals bought?

80. Find the greatest common divisor of 1,095 and 8,030.

81. A farmer wishes to put 364 bushels of corn and 455 bushels of oats into the least number of bins possible that shall contain the same number of bushels without mixing the two kinds of grain; what number of bushels must each bin hold?

82. Find the least common multiple of 7, 108, 125, and 180.

83. Divide the continued product of 12, 5, 183, 18, and 70, by the continued product of 3, 14, 9, 5, 20, and 6.

84. A trader purchased a lot of horses and oxen for $2,000, paying twice as much for a horse as for an ox. There were three times as many oxen as horses, and the horses cost him $80 a head. Required the number of each.

85. The mails of the United States in 1862 were carried 2,001,500 miles by steamboat, at an expense of $300,225; by coaches 7,268,400 miles, for $1,744,416; and by railroad 22,777,200, for which $2,505,492 were paid. How much was the rate per mile by each mode of transportation?

86. If 213 × 84 × 190 × 264 be divided by 30 × 56 × 36, what will be the quotient?

87. Multiply 64 by 7 times 31 and divide the product by 8 times 56; multiply this quotient by 15 times 88 and divide the product by 55; multiply this quotient by 13 and divide the product by 4 times 6.

88. The population of eight of the largest cities of France in 1866 was as follows:

Cities.	Pop.	Cities.	Pop.
Paris	1,825,274	Lille	154,749
Lyons	323,954	Toulouse	126,936
Marseilles	300,131	Nantes	111,956
Bordeaux	194,241	Rouen	100,671

How much did the population of Paris exceed that of *all the other cities?*

89. What is the value of $16 \times 3{,}125 - (49 \times 7) + (125 \times 27) - (9 \times 32 + 43{,}264) - \overline{16 \times 9}$?

90. If the President of the United States expends daily $60, how much will he be able to save at the end of four years, his salary being $50,000 per annum?

91. A merchant expended for cloth $7,850. He sold a certain number of yards for $5,580, at $15 per yard, and gained on what he sold $1,860. How many yards did he buy, and how much did he gain per yard on the cloth sold?

92. A horse worth $120, and 4 cows at $28 each, were exchanged for 31 sheep and $46 in money. What were the sheep valued at per head?

93. According to ecclesiastical statistics for 1870, there were in Europe 146,000,000 Catholics, 70,220,000 Protestants, 68,000,000 Greek Catholics, and 4,500,000 Jews. The entire population was 295,803,933. How many belonged to other denominations, or whose religious creed was not ascertained? How many more Catholics than all others named?

94. There were 476,203 votes cast for two candidates for governor in Ohio in 1863. The majority of the successful candidate was 101,079. How many votes were cast for each?

95. A speculator had 210 acres of land, which he might have sold at $220 an acre, and gained $6,300; but after holding for a time, he sold it at a loss of $3,150. How much per acre did it cost him, and for how much per acre did he sell it?

96. A merchant bought 3 pieces of cloth of equal lengths at $5 a yard; he gained $35 on the whole cost by selling 2 pieces for $350. How many yards in each piece?

97. It is estimated that the annual loss to the United States by intemperance is $98,400,000. How many school-houses could be built, and schools sustained each year with this sum, provided that the cost of a school-house, and the yearly expenses of the school, were each $2,000?

98. At a certain election 5,000 votes were cast for 3 candidates, A, B, and C. B had 400 more than A, and C 300 more than B. How many votes did A receive?

99. The forward wheels of a carriage are 7 feet in circumference, and the hind wheels 10. How many times will each revolve in passing over 42 miles, there being 5,280 feet in a mile?

100. What number is that which being divided by 72, the quotient increased by 25, the sum diminished by the difference between 25 and 18, the remainder multiplied by 7, and the product increased by $\overline{(9 \times 8) \div (3 \times 4)}$, the sum will be 167?

101. A man paid $1,024 for a farm, $250 for drainage, $50 for fencing, and for hired labor $376. The gross proceeds of one year amounted to $2,100; with the profits he purchased an equal number of sheep at $3 each, and horses at $77 a piece. How many of each did he buy?

102. A teacher having a school of 144 ladies and 128 gentlemen, divided it into the largest possible equal classes, so that each class of ladies should number the same as each class of gentlemen. What was the number of classes?

103. The quotient of one number divided by another is 74, the divisor is 321, and the remainder 95. What is the dividend?

104. One-half the sum of two numbers is 500, and one-*half their difference* is 300. What are the numbers?

105. From Jan. 1 to April 15, 1864, 27 gold mining companies were organized in New York, with an aggregate capital of $63,450,000. What was the average capital of each company?

106. Two persons, starting from the same place and traveling in opposite directions, are 20 miles apart at the end of one hour, but traveling in the same direction they are 6 miles apart at the end of an hour. How far does each travel per hour?

107. Having money to invest I buy 2 farms worth $4,550 each, 20 shares railroad stock at $106 per share, and have $250 left. How much had I at first?

108. A grocer gave 153 barrels of flour worth $9 a barrel for 81 barrels of sugar containing 170 pounds each. What was the cost of the sugar per pound?

109. Required the actual value of my farm if $25,344 is 6 times the sum I paid for it, and it cost me $776 less than its real value.

110. The army pension rolls stood as follows June 30, 1863: Invalid pensioners, 7,248, to whom $570,648 was payable annually; Revolutionary soldiers, 18, to whom $1,045 was payable; widows of Revolutionary soldiers, 1,573, amount payable to them, $129,684; widows, mothers, sisters, and orphans in wars since the Revolution, 4,820, annual payment to the same $526,266. What was the whole number of pensioners and the sum paid them?

111. Bought 25 sheep for $56; how much less per head should I have paid had I purchased 7 more sheep with the same money?

112. How many barrels of apples at $4 per barrel must be given in exchange for 10 bags of wheat, each containing 3 bushels, at $2 per bushel?

113. During the first 3 months of 1864 there were 27 gold-mining companies organized in New York city, with an average capital of $2,350,000; 4 silver companies, with an average capital of $3,625,000; 8 coal and iron companies, whose average capital was $1,250,000; and 4 copper companies, with an average capital of $625,000. How much capital was invested in mining companies during the three months?

114. F. Harriman purchased 318 acres of wild land for $6,996, and sold 253 acres at $17 per acre, and the remainder at cost. Did he gain or lose, and how much?

115. Ten men agreed to gather 1,000 bushels of cranberries, and to receive for their labor one-half the quantity gathered. After 400 bushels were gathered 4 men withdrew, leaving the others to complete the job. How many bushels should each man receive?

116. The product of three numbers is 7,650, and the product of two of them is 450; what is the other number?

117. A house and lot valued at $1,200, and 6 horses at $95 each, were exchanged for 30 acres of land. At how much was the land valued per acre?

118. Two travelers set out at the same time from places 696 miles distant from each other, and travel towards each other till they meet, when it appears that one has come 27 miles a day, and the other 31 miles a day; how many days were they on the journey.

119. If 2, 2, 5, and 7 are four factors of 1,680, what is the other factor?

120. A can shear 41 sheep in a day, B 63, and C 54; what is the number of sheep in the smallest flock that would *furnish* exact days labor for each of them shearing alone?

CHAPTER III.

THE exercises and examples of this chapter, mental and written, involve the application of the principles and processes of Simple, Common, and Decimal Fractions, and United States Money, in combination with the subjects of the preceding chapter.

MENTAL EXERCISES.

1. If a barrel of pork cost \$20, what will $\frac{1}{4}$ of it cost? $\frac{2}{5}$? $\frac{3}{4}$? $\frac{4}{5}$?

2. If 8 pounds of sugar cost \$1, what part of a dollar will 2 pounds cost? 3 pounds? 4 pounds? 5 pounds? 6 pounds?

3. How many more are $140 \div 10$ than $72 \div 6$?

4. In \$$4\frac{3}{5}$ how many dimes? in \$$7\frac{1}{2}$? in \$$8\frac{7}{10}$? in \$$9\frac{1}{5}$?

5. When railroad fare is 3 cents a mile, how far can you ride for \$2.88?

6. At .6 of a dollar per yard, what will 1.2 yards of cloth cost?

7. If a boy earn \$$3\frac{2}{3}$ in 1 week, how much can he earn in 2 weeks? in 3? 4? 5? 6? 7?

8. $7\frac{2}{3}$ is $\frac{1}{3}$ of what number? $\frac{1}{4}$? $\frac{1}{5}$? $\frac{1}{6}$? $\frac{1}{7}$? $\frac{1}{8}$?

9. From 4.5 take .25; from 2 take .005.

10. If 7 yards of cloth cost \$$30\frac{1}{3}$, what will 1 yard cost? 3 yards? 5 yards?

11. What is the sum and difference of $\frac{5}{7}$ and $\frac{2}{3}$? of $1\frac{1}{2}$ and $\frac{4}{5}$? of $\frac{3}{8}$ and $2\frac{1}{6}$?

12. A man is 49 years old, and $\frac{3}{7}$ of his age equals the age of his son; how old is his son?

13. 75 are how many times 5? 6? 7? 8? 9? 12? 25?

14. What is the sum of .3, .5, .08, and .125?

15. Divide $\frac{2}{3}$ of 30 by $\frac{1}{2}$ of 5; $\frac{7}{8}$ of 40 by $\frac{2}{7}$ of 33.

16. Multiply $\frac{2}{5}$ of 19 by $\frac{3}{4}$ of 8; $\frac{1}{3}$ of 5 by $\frac{2}{5}$ of 82.

17. What is $\frac{5}{8}$ of $28\frac{4}{5}$? $\frac{2}{7}$ of $15\frac{1}{6}$? $\frac{4}{9}$ of $20\frac{4}{7}$? $\frac{3}{4}$ of $16\frac{2}{3}$?

18. Subtract $\frac{1}{4}$ of 11 from $\frac{1}{2}$ of 13; $\frac{3}{8}$ of 32 from $\frac{4}{5}$ of 40.

19. At 6 cents a pound what will 15 pounds of nails cost?

20. Paid .35 of a dollar for sugar, .7 for tea, .9 for coffee; how much was paid for all?

21. 6 times 9 and $\frac{7}{9}$ of 9 are how many? 8 times 10 and $\frac{1}{2}$ of 10?

22. What is the sum of $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$? of $\frac{4}{5}$, $\frac{7}{10}$, and $\frac{1}{4}$?

23. Subtract $\frac{1}{4}$ of $1\frac{1}{2}$ from $\frac{3}{5}$ of $\frac{2}{3} + \frac{1}{2}$.

24. From $\frac{7}{9} + \frac{2}{3}$ take $1\frac{1}{2} - \frac{3}{4}$ of $1\frac{1}{3}$.

25. To $4\frac{1}{2} + \frac{7}{8} + \frac{1}{4}$ add $2\frac{3}{4} - \frac{3}{8}$; to $14\frac{7}{10}$ add 5.3.

26. If 5 dozen eggs are worth \$1, how many cents is 1 dozen worth?

27. If the sum of two fractions be $\frac{5}{8}$, and one of them be $\frac{9}{20}$, what is the other?

28. $\frac{7}{9}$ of $63 - \frac{3}{8}$ of 24 are how many times 4? 7? 9? 12? 20?

29. When tenths are multiplied by units what denomination is the product? tenths by tenths? tenths by hundredths? hundredths by hundredths? hundredths by *thousandths*?

30. What is the product of .3 × .05? of .06 × .125? of 02 × .09?

31. Multiply 15 thousandths by 4 ten-thousandths?

32. If \$20 is $\frac{4}{5}$ of the monthly rent of a house, how much s the rent for a year?

33. Divide .25 by .05; .2 by .04; 25 by .125; .6 by .012.

34. By adding $\frac{2}{5}$ to a certain number the sum is $\frac{3}{4}$; what s the number?

35. If $\$\frac{3}{4}$ will buy $\frac{9}{10}$ of a bushel of potatoes, what is the price of a bushel?

36. 63 is $\frac{3}{5}$ of what number? $27\frac{1}{2}$ is $\frac{5}{8}$ of what number?

37. $\frac{3}{4}$ of 16 is 3 times what number? is $\frac{6}{7}$ of what number?

38. $\frac{8}{9}$ are $\frac{5}{8}$ of what number? $\frac{3}{4}$ are $\frac{6}{7}$ of what number?

39. 12 are how many times $\frac{3}{8}$? $6\frac{4}{5}$ are how many times $\frac{4}{3}$?

40. $4\frac{9}{10}$ are how many times $6\frac{2}{5}$? $7\frac{2}{9}$ are how many times $4\frac{1}{6}$?

41. $\frac{3}{5}$ of 25 are $\frac{3}{8}$ of what number? $\frac{5}{9}$ of what number?

42. $\frac{2}{11}$ of 121 are $\frac{2}{9}$ of how many times 7?

43. $\frac{3}{7}$ of $\frac{1}{3}$ of 63 are $\frac{1}{4}$ of $\frac{3}{5}$ of how many times 11?

44. $\frac{3}{4}$ of $\frac{2}{3}$ of 70 are $\frac{5}{12}$ of 4 times what number?

45. Paid $\$\frac{7}{8}$ for a cravat, which was $\frac{2}{7}$ of what I paid for a vest: what was the cost of the vest?

46. A man being asked his age replied that if he were times as old, $\frac{1}{3}$ of his age would be 28 years; how old vas he?

47. $\frac{2}{3}$ of 42 are $\frac{4}{7}$ of how many fifths of 35?

48. $\frac{5}{9}$ of $\frac{6}{3}$ of 18 are 4 times what part of 35?

49. $\frac{6}{4}$ of $\frac{2}{5}$ of 80 is 3 times what part of 96?

50. $16\frac{4}{5}$ is $\frac{7}{3}$ of how many times $\frac{1}{9}$ of 54?

51. 40 is $\frac{2}{3}$ of $\frac{5}{7}$ of $\frac{1}{2}$ of 8 times what number?

52. $\frac{3}{10}$ of 150 are $\frac{3}{4}$ of how many times $\frac{3}{8}$ of 40?

53. $\frac{1}{6}$ of $\frac{5}{3}$ of 36 are $\frac{1}{8}$ of $\frac{2}{5}$ of how many times $\frac{2}{3}$ of $\frac{5}{8}$ of 120?

54. If $\frac{4}{5}$ of a barrel of flour cost $8, what will 1 barrel cost?

55. What number must be added to $16\frac{9}{10}$ to make $25\frac{2}{3}$?

56. A person lost in play $\frac{1}{3}$, $\frac{2}{5}$, and $\frac{1}{8}$ of his money; what part had he left?

57. A laborer worked 3 days for $1\frac{1}{3}$, $\frac{7}{8}$, and $1\frac{1}{2}$ dollars; at $2 a day how much more would he have received?

58. James bought a sled for $62\frac{1}{2}$ cents, and sold it for $12\frac{1}{2}$ cents more than he gave for it; how much did he receive for it?

59. What is the difference between $9 + 12\frac{5}{7}$ and $8\frac{2}{5} + 4\frac{1}{7}$?

60. At $\frac{2}{5}$ of a dime each, what will 15 oranges cost?

61. If $\frac{7}{16}$ of a barrel of flour be given to each of 9 poor families, how many barrels will all receive?

62. What will be the cost of $\frac{1}{3}$ of a cord of wood at $\$7\frac{3}{4}$ a cord?

63. What is the product of 5 times $3\frac{1}{5} \times 2\frac{7}{8}$?

64. Bought $9\frac{1}{2}$ yards of silk at 10 shillings a yard, and $12\frac{5}{8}$ pounds of tea at 6 shillings a pound? how much more did the silk cost than the tea?

65. When potatoes are $\$\frac{3}{8}$ a bushel, how many can be bought for $8?

66. If $\frac{5}{8}$ of a ton of hay cost $7, what will 1 ton cost?

67. What will 3.6 yards of ribbon cost at $\$\frac{3}{10}$ per yard?

68. A man owning $\frac{7}{9}$ of a mill, sold $\frac{6}{7}$ of his share; what part of the mill did he still own?

69. How many pounds of tea worth $\$\frac{7}{12}$ a pound must *be given for 9* bushels of apples worth $\$\frac{4}{9}$ a bushel?

70. Bought apples at the rate of 3 for 2 cents, and sold them at the rate of 5 for 4 cents; what was the gain on 15 apples?

71. How many quarts of berries at 8 cents a quart will pay for $5\frac{2}{3}$ yards of ribbon at 9 cents a yard?

72. If a staff 3 feet long cast a shadow of 2 feet, how long is the pole whose shadow measures 17 feet?

73. How much carpeting $\frac{2}{3}$ of a yard wide is equal to 7 yards $\frac{3}{4}$ of a yard wide?

74. If $\frac{2}{3}$ of a cord of wood cost $4, what will 5 cords cost?

75. If $\frac{1}{2}$ barrel of sugar is worth $9, what is $\frac{3}{4}$ of a barrel worth?

76. If 12 yards of cloth cost $48, how many yards can be bought for $114?

77. A person made a journey of 60 miles, traveling $\frac{1}{4}$ the distance the first day, $\frac{1}{3}$ of the remainder the second day, and $\frac{3}{5}$ of the remainder the third day; how many miles remained to be traveled?

78. A farmer after selling $\frac{3}{5}$ of his flock of sheep had 20 left; how many had he at first?

79. $\frac{3}{4}$ of John's age, increased by 10 years, equals $1\frac{1}{4}$ times his age; how old is he?

80. James having $\$\frac{2}{3}$, gave $\frac{3}{5}$ of it for a knife; what part of a dollar had he left?

81. A horse was sold for $80, which was $\frac{1}{2}$ of $\frac{2}{3}$ of twice the cost; how much was lost on the horse?

82. If $\frac{3}{4}$ of 2 pounds of tea cost $\$1\frac{1}{2}$, what will $\frac{4}{5}$ of a pound cost?

83. If $\frac{2}{5}$ of 4 tons of coal cost $\$9\frac{1}{7}$, what will $\frac{3}{4}$ of 2 tons cost?

84. If $\frac{1}{2}$ yard of cloth cost \$$\frac{3}{5}$, what will $\frac{7}{8}$ of a yard cost?

85. How many yards of cloth that is $\frac{4}{5}$ of a yard wide are equal to 12 yards $\frac{3}{4}$ of a yard wide?

86. $\frac{3}{7}$ of $\frac{1}{3}$ of 63 are $\frac{1}{4}$ of $\frac{3}{5}$ of how many times 11?

87. If 5 yards of lace cost \$$1\frac{7}{8}$, how many yards will \$$2\frac{5}{8}$ buy?

88. William is $7\frac{3}{4}$ years old, and John $6\frac{1}{3}$ years less than twice as old; what is the difference in their ages?

89. A man owing \$$12\frac{5}{8}$, paid \$$9\frac{1}{5}$; how much does he still owe?

90. Three men incurred an expense of \$$14\frac{1}{2}$; how much less than \$$6\frac{1}{3}$ must each pay?

91. If 7 bushels of apples cost \$$3\frac{1}{2}$, how many bushels will \$$14\frac{1}{2}$ buy?

92. What number added to 3 times $\frac{2}{9}$ of 27 will make the number 40?

93. If $\frac{2}{3}$ the value of a carriage is equal to $\frac{3}{4}$ the value of a horse, and the difference in their values is \$25, what is the value of each?

94. What number taken from $2\frac{1}{2}$ times $12\frac{4}{5}$ will leave $20\frac{3}{4}$?

95. At \$6 a barrel for flour, what part of a barrel will \$$2\frac{2}{5}$ buy?

96. Bought 6 bushels of corn at \$$\frac{5}{8}$ a bushel, and had \$40 left; how much money had I at first?

97. Sold a horse for \$128, which was $\frac{4}{7}$ of what he cost; how much did I lose on him?

98. If a horse run $\frac{4}{9}$ of a mile in a minute, how many minutes would it take him to run $\frac{19}{27}$ of a mile?

99. What number must be multiplied by $\frac{5}{7}$ to produce $\frac{5}{8}$?

100. A and B built a wall: A built 20 rods, which was $\frac{4}{5}$ as much as B built; what was the entire length of the wall?

101. A painter used $\frac{4}{5}$ of $\frac{5}{6}$ of a keg of white lead, worth $\$2\frac{3}{4}$ a keg; what part of the whole keg did he use, and what was its value?

102. To what number must be added $\frac{1}{4}$ and $\frac{2}{5}$ of itself to make 66?

103. When potatoes are worth $\$\frac{5}{6}$ a bushel, how many can be bought for $\$\frac{3}{4}$?

104. If 3 yards of velvet cost $\$5\frac{1}{4}$, how much more than \$9 will 6 yards cost?

105. A stone mason worked $11\frac{2}{3}$ days, and after paying his board and other expenses with $\frac{3}{7}$ of his earnings had \$20 left; how much did he receive a day?

106. A can build a wall in 3 days, and B can build the same in 4 days; in what time can both together build it?

107. If I should exchange 10 bushels of oats worth $\$\frac{2}{5}$ a bushel for $\frac{5}{9}$ of a barrel of flour worth \$8 a barrel, how much would I gain?

108. $\frac{1}{2}$ of $\frac{3}{4}$ is $\frac{2}{3}$ of how many times $\frac{3}{5}$ of 15?

109. A father divided \$42 between his 2 sons, so that $\frac{2}{3}$ of Asa's share equalled $\frac{8}{9}$ of Edward's; how many dollars had Asa?

110. Divide 60 into two such parts that $2\frac{1}{2}$ times the smaller will equal $1\frac{2}{3}$ times the larger?

111. If $\frac{3}{4}$ of a ton of hay be exchanged for $4\frac{1}{2}$ cords of wood at $\$2\frac{1}{2}$, what is 1 ton worth?

112. $\frac{2}{3}$ of $\frac{1}{2}$ of 84 is $\frac{4}{9}$ of how many times $\frac{1}{4}$ of $\frac{3}{8}$ of 96?

113. If 6 pounds of cheese cost .9 of a dollar, what will 1 pound cost?

114. A lady's shawl cost \$60; $\frac{4}{5}$ the cost of the shawl was $\frac{8}{9}$ of 6 times the cost of her dress; what was the cost of her dress?

115. A young lady being asked her age, replied that 5 times $\frac{1}{3}$ of 30 years was $4\frac{1}{4}$ years more than 3 times her age; what was her age?

116. If $\frac{2}{3}$ of a ton of hay cost $\frac{4}{5}$ of an eagle, how many dollars will $\frac{1}{6}$ of a ton cost?

117. Paid \$$7\frac{2}{3}$ for a barrel of flour, and $1\frac{4}{5}$ times as much for a ton of hay; what was the cost of the hay?

118. A man pays \$400 rent, and $\frac{3}{4}$ of this is just $\frac{2}{3}$ of $\frac{1}{2}$ of twice his annual income; what is his annual income?

119. If a pole 8 feet long cast a shadow 6 feet, how long is a pole that casts a shadow $12\frac{1}{2}$ feet at the same time?

120. If 10 bushels of wheat are worth $22\frac{1}{2}$ bushels of corn, how many bushels of corn are 3 bushels of wheat worth?

121. A boy sold 5 quarts of strawberries at the rate of 3 quarts for 13 cents; how much did he receive for the whole?

122. The distance from Baltimore to Washington is 39 miles; if 5 miles be subtracted from $\frac{2}{3}$ of this distance, the remainder will be $\frac{3}{7}$ times $\frac{1}{2}$ the distance from Philadelphia to Baltimore; what is the distance from Philadelphia to Washington?

123. Divide 1.44 by 1.2; by .12; by 12.

124. If $\frac{3}{4}$ of a piece of land cost \$6,000, what will $\frac{1}{8}$ cost?

125. Divide \$5 by half a cent.

126. Multiply $2\frac{1}{2}$ by $2\frac{1}{2}$, and divide the product by 2.5.

WRITTEN EXAMPLES.

1. How many melodeons at \$$66\frac{2}{3}$ are worth as much as 4 pianos at \$$333\frac{1}{3}$ each?

2. It is estimated that the public lands of the United States amount to 2,265,625 square miles; if $\frac{1}{2}$ of this was donated to various purposes, and the remainder was sold at \$1.25 per acre, what would be the net income?

3. A farmer sold 34 bushels of oats and 26 bushels of corn for \$63.10. He received for the corn 35 cents more per bushel than for the oats. What was the price of each per bushel?

4. If $5\frac{4}{7}$ yards of calico cost \$1.17, how much must be paid for $43\frac{1}{3}$ yards?

5. Change $\frac{7}{11}$ of $\frac{13}{14}$ of $\frac{22}{39}$ to an equivalent fraction, having 75 for its denominator.

6. If cloth 1.875 yards in breadth require 18.75 yards in length to make a certain number of garments, how many yards in length will it require if the cloth be .625 yards wide?

7. Three men rented a farm and raised 960 bushels of grain, which was divided in proportion to the rent paid by each; the first was to have $\frac{1}{2}$ of the whole, the second $\frac{2}{3}$ of the remainder, and the third what was left. How much did each receive, the grain being worth \$2 a bushel?

8. A farmer exchanged 40 bushels of corn and oats, mixed in equal quantities, at \$1.25 and \$.95 per bushel respectively, for wheat and rye in equal quantities, at \$2.25 and \$2.15 per bushel respectively. How many bushels each, of wheat and rye, did he obtain?

9. A has $310, B $558, and C $744, with which they agree to purchase horses at the highest price per head that will allow each man to invest all his money. How many horses can each man buy?

10. From July 1, 1870, to April 22, 1871, 1,983,000 pounds of tea were shipped from Yokohama to San Francisco; what would be the total value at an average price of $.66$\frac{2}{3}$ per pound?

11. In a certain school-room, $\frac{7}{9}$ of the desks are occupied: $\frac{1}{3}$ of the scholars study grammar; $\frac{1}{6}$ study physiology; $\frac{1}{7}$ study book-keeping; and the remaining scholars are equally divided into 3 algebra classes. $\frac{1}{2}$ of the most advanced algebra class study geometry, and there are 5 in the geometry class. What is the number of scholars in the school-room, and how many desks are unoccupied?

12. $\frac{8}{11}$ of a certain number exceeds $\frac{4}{7}$ of the same by 156. What is the number?

13. Bought 17 cwt. of prunes at $15 per cwt., and gave in exchange for them 250 pounds of butter at 25 cents per pound, 48 dozen eggs at 15 cents per dozen, and the remainder in salt at $1.70 per bushel. How many bushels of salt were required?

14. I exchanged 14$\frac{3}{8}$ cords of wood at 4\frac{1}{2}$ per cord, for flour at 9\frac{6}{7}$ per barrel. How much flour did I receive?

15. Divide .0172$\frac{17}{64}$ by .03$\frac{1}{16}$, and obtain a quotient true to four decimal places.

16. A man purchased a number of lemons at 2 cents each, and $\frac{3}{4}$ as many at 3 cents each; he sold them all at the rate of 2 for 5 cents, and gained 25 cents. How many *of each kind* did he purchase?

17. A merchant had $9,000 with which to purchase goods. He bought 20 pieces of sheeting, each containing 44 yards, at $.12 per yard; 400 pieces of calico, of 31 yards each, at $.17$\frac{1}{2}$ per yard; 25 pieces of cassimere, each containing 38.75 yards, at $2.375 per yard; 100 pieces of silk, each containing 29$\frac{3}{4}$ yards, at $.95 a yard. How much money had he left?

18. How many times can a vessel containing $\frac{1}{4}$ of a gallon be filled from $\frac{2}{3}$ of a barrel containing 31$\frac{1}{2}$ gallons?

19. If the average circulation of the New York Daily Tribune be 50,000, how many copies are sold in a year, Sundays excepted, and what is their value at 3 cents a copy?

20. Divide the sum of .075 and .0075 by the difference of 7.5 and .75?

21. Divide $\frac{\frac{3}{4} \text{ of } \frac{4}{25} \times 5\frac{1}{3}}{\frac{3}{5} \text{ of } 2\frac{1}{7} \times 3\frac{1}{2}}$ by $\frac{\frac{4}{9} \text{ of } 9\frac{3}{5}}{\frac{8}{13} \text{ of } 3}$.

22. A can do a piece of work in $\frac{3}{4}$ of a day; B can do it in $\frac{4}{5}$ of a day, and C can do it in 1$\frac{1}{3}$ days. In what time can all do it working together?

23. If 5$\frac{1}{2}$ pounds of coffee cost 1\frac{1}{10}$, what will 27$\frac{1}{2}$ pounds cost?

24. A certain number multiplied by 2.5 and divided by 5.2 produces 1; what is the number?

25. What is the least common multiple of $\frac{2}{5}$, $\frac{7}{10}$, $\frac{14}{15}$, and $\frac{8}{25}$?

26. The gold coin made at the U. S. Mint in Philadelphia in 1863 was as follows: 152,963 double eagles, 3,658 eagles, 6,902 half eagles, 39 three-dollar pieces, 20,990 quarter eagles, and 1,950 dollar pieces. What was the whole number of pieces made, and their value?

27. Divide \$2,000 between two persons so that one shall have $\frac{7}{9}$ as much as the other.

28. The silver coin made at the mint in Philadelphia in 1863 was as follows: 31,400 dollars, 425,260 half-dollars, 412,860 quarter-dollars, 49,460 dimes, 64,460 half-dimes, and 93,460 three-cent pieces. Required the whole number of pieces made, and their value.

29. Add the following fractions: $\frac{1}{3}$ of $\frac{3}{5}$, $2\frac{1}{6}$, $\frac{3}{4}$ of $\frac{2}{3}$ of 5, $\frac{3}{7}$ of $\frac{6}{7}$ of $3\frac{1}{2}$.

30. Bought a cord of wood for \$4.625, a cheese for $\$7.56\frac{1}{4}$, and $14\frac{9}{16}$ pounds of butter at \$.25 per pound. What was the cost of the whole?

31. A lumber dealer bought 212,500 feet of lumber at \$14.375 per M, and retailed it out at \$1.75 per C; how much was his whole gain?

32. At $\$1\frac{1}{2}$ a bushel, how many bushels of wheat can be bought for $\$37.68\frac{3}{4}$?

33. If a pound of tea be worth $\$.62\frac{1}{2}$, what is .8 of a pound worth?

34. If $\frac{2}{3}$ of a bushel of corn be worth $\frac{3}{7}$ of a bushel of wheat, and wheat be worth \$1.40 a bushel, how many bushels of corn will \$27 buy?

35. After spending $\frac{1}{4}$, $\frac{2}{3}$ of $\frac{6}{7}$, and $\frac{1}{14}$ of my money, I had $\$48\frac{6}{7}$ left. How much had I at first?

36. Divide 13.5 by $2\frac{1}{4}$ hundredths?

37. A gentleman purchased a farm of 325.5 acres for $\$10,660\frac{1}{8}$; how much did it cost per acre?

38. What will be the cost of 840 feet of plank at \$1.94 per C, and 1,262 pickets at $\$12\frac{1}{2}$ per M?

39. If 21.65 tons of hay are sold for $\$1,082\frac{1}{2}$, what will 1 ton cost?

40. What will 42.875 yards of cloth cost at $\$5\frac{1}{3}$ per yard?

41. From the sum of forty-nine and three-tenths, four hundred, and three millionths, subtract two hundred and forty-six, and three thousandths; multiply the remainder by five thousand, and divide the product by four ten-thousandths.

42. What is the continued product of

$$\frac{9}{38\frac{1}{4}} \times \frac{174\frac{4}{9}}{196\frac{1}{4}} \times \frac{44\frac{5}{8}}{16\frac{1}{3}} \times \frac{40\frac{8}{11}}{36\frac{4}{7}}?$$

43. What number is that from which, if 11 be subtracted, $\frac{7}{9}$ of the remainder will be 42?

44. What is the value of 720 pounds of hay at \$12.75 a ton, and 912 pounds of middlings at $\$15\frac{1}{2}$ a ton?

45. Bought 12 yards of cloth at $\$.37\frac{1}{2}$ per yard, and agreed to pay $\frac{1}{2}$ the cost in butter, at $\$.16\frac{2}{3}$ per pound; $\frac{1}{6}$ in money, and the remainder in eggs, at $\$.12\frac{1}{2}$ per dozen. How many pounds of butter and dozens of eggs were required?

46. How much must be paid for 972 feet of boards at \$20.25 per M, 1,575 feet of scantling at $\$2.87\frac{1}{2}$ per C, and 8,756 feet of lath at $\$7\frac{1}{2}$ per M?

47. What is the value of 1,046 pounds of beef at $\$4\frac{5}{8}$ per hundred pounds?

48. What is the value of 5,840 pounds of anthracite coal at \$4.7 a ton, and 4,376 pounds of shamokin coal at \$5.25 a ton?

49. If a certain number be increased by $1\frac{3}{4}$, this sum diminished by $\frac{3}{8}$, this remainder multiplied by $5\frac{2}{5}$, and this product divided by $1\frac{2}{7}$, the quotient will be $7\frac{1}{2}$; what is the number?

50. What is the greatest common divisor of 4, $2\frac{2}{5}$, $2\frac{2}{5}$, and $\frac{4}{90}$?

51. A farmer sold at one time 7 tons and 375 thousandths of a ton of hay, at another time 12 tons and 3,125 ten-thousandths of a ton, and at a third time 13 tons and 3,125 hundred-thousandths of a ton, at an average price of \$8 per ton. How much did he receive for the whole?

52. If a person agree to do a job of work in 30 days, what part of it ought he to do in $16\frac{1}{2}$ days?

53. From one take two ten-millionths.

54. Reduce $\frac{2\frac{1}{2} \times \frac{3}{5}}{\frac{5}{8} \text{ of } 3\frac{1}{5}}$ to a decimal fraction.

55. If 21.65 tons of hay are sold for \$$541\frac{1}{4}$, what will 1 ton cost?

56. What will $112\frac{7}{8}$ yards of cloth cost at \$$4\frac{1}{3}$ per yard?

57. A merchant going to New York to purchase goods, had \$11,000. He bought 40 pieces of silk, each piece containing $28\frac{1}{2}$ yards, at \$.80 a yard; 300 pieces of calicoes, with an average length of 29 yards, at $11\frac{1}{2}$ cents a yard; 20 pieces of broadcloths, each containing 36.25 yards, at \$3.875 a yard; 112 pieces of sheeting, each containing 30.5 yards, at \$.$06\frac{1}{4}$ a yard. How much had he left with which to finish purchasing his stock?

58. There are two numbers whose sum is 1.1, and whose difference is $\frac{2}{5}$; what are the numbers?

59. A owns $\frac{5}{9}$ of a ship; he sells $\frac{3}{5}$ of his share for \$1,800. What is the value of the ship?

60. A can perform a piece of work in 9 days; A and B together can do the same in 6 days; A, B, and C working together can do it in 4 days. In how many days can B and C, working together, perform the whole?

61. What is the sum of $5\frac{3}{64}$ decimal units of the first order, $6\frac{5}{32}$ of the second order, $7\frac{9}{16}$ of the third order, $8\frac{3}{8}$ of the fourth order, $9\frac{3}{4}$ of the fifth order, and $3\frac{1}{2}$ of the sixth order?

62. Multiply the sum of the quotients of $270 \div 4{,}000$; $1{,}307 \div .008$; $.0103 \div .04$; $70.306 \div .5$; $3.78 \div 200$; $.04735 \div .0005$; $30 \div .004$; $903 \div 30{,}000$ by 25.25.

63. There are two numbers whose sum is $1\frac{3}{40}$, and whose difference is $\frac{7}{40}$. What are the numbers?

64. A, B, and C own a furnace: A owns $\frac{57}{154}$ of it; B owns $\frac{3}{22}$ of it more than C. What parts of the furnace do B and C own respectively?

65. What is the sum of the continued products of $\frac{2}{7} \times 4\frac{2}{3} \times \frac{5}{6} \times \frac{3}{4} \times \frac{9}{10}$ and $3\frac{2}{3} \times \frac{3}{7} \times \dfrac{2\frac{1}{3}}{5\frac{1}{2}}$?

66. I purchased a quantity of grain, $\frac{3}{8}$ of it being oats, at \$.75 a bushel; $\frac{7}{16}$ wheat, at \$1.50 a bushel, and the remainder barley, at \$.90 a bushel, to the amount of \$7.425. How much did I pay for the whole?

67. Multiply $\frac{7}{9}$ of $\frac{9}{11}$ of $\frac{11}{14}$ by $\frac{5}{18}$ of $\frac{18}{19}$ of $\frac{19}{25}$.

68. Divide 172,170,063 by .0,000,009.

69. What will $15\frac{11}{12}$ dozen eggs cost at $18\frac{1}{2}$ cents per dozen?

70. Add nine ten-thousandths, 1,000 and six-millionths, 3 and forty-seven ten-millionths, 246 and twenty-five thousandths.

71. How many pairs of pants can be made from 48.6 yards of cloth, allowing 1.8 yards per pair?

72. What is the sum of $2\frac{1}{8}$ decimal units of the first order, $4\frac{3}{4}$ of the second order, $7\frac{1}{16}$ of the third order, and $9\frac{3}{25}$ of the fourth order?

73. At $5.47 per barrel for apples, what will 83 barrels cost? What cost 8.3 barrels? .83 of a barrel?

74. Multiply 1.245 by .27; .23 by .009.

75. Multiply 900 by .009; .005 by .0075.

76. Multiply 8.03 by .008; 2.37 by 9.58.

77. Multiply 3.07 by .75; 125 by .0005.

78. The product of 3 numbers is 112; one of them is $5\frac{3}{5}$, another is $6\frac{1}{8}$. What is the third?

79. Divide .7056 by .84; 345.15 by .075.

80. Divide .75 by 8; .8 by 476.3.

81. Divide 3.03 by 4.08; .455 by .0216.

82. Divide 21 by .375; 12 by 15.278.

83. Divide .0189 by .025; 80.46 by 894.

84. Bought 320 bushels of barley at the rate of 16 bushels for $10.04, and sold it at the rate of 20 bushels for $$17\frac{1}{2}$; how much was my profit on the transaction?

85. John Brown killed an ox, which, when dressed, weighed 1,178$\frac{3}{5}$ pounds; he kept $\frac{3}{5}$ of it for his own use, and sold $\frac{2}{3}$ of the remainder to Hiram Jones. What was the value of the remainder at $11\frac{1}{4}$ cents per pound?

86. Reduce .625 to a common fraction; .375; .016.

87. Reduce $\frac{8\frac{3}{4}}{17\frac{1}{2}}$ to a decimal fraction.

88. A merchant purchased 17 bales of cotton goods containing $587\frac{1}{2}$ yards, at $8\frac{3}{4}$ cents per yard; he sold $\frac{1}{3}$ of it at $11\frac{1}{2}$ cents per yard, and $\frac{3}{4}$ of the remainder at $12\frac{1}{2}$ cents per yard. How much would he receive for what still remained at 13 cents per yard, and what profit would the merchant make on his bargain?

89. What number is that from which, if $7\frac{1}{6}$ be taken, the remainder will be $9\frac{2}{3}$?

90. The debt of Canada Jan. 1, 1871, was $107,000,000, and the population 4,250,000; what would be the average tax per head to pay the debt?

91. A barrel holding $31\frac{1}{2}$ gallons is $\frac{4}{9}$ full; $9\frac{1}{2}$ gallons being drawn off, what part of the contents remains?

92. Reduce to their lowest terms $\frac{13308}{14417}$; $\frac{427}{671}$; $\frac{5473}{5603}$; and $\frac{1389}{3704}$.

93. What number multiplied by 8 equals $3\frac{1}{2}+\frac{1}{4}+\frac{16}{25}+\frac{43}{50}$?

94. A had $576, which was $156 more than $\frac{3}{4}$ of $2\frac{1}{2}$ times B's money. How much money had B?

95. If $\frac{1}{4}$ of John's marbles equals $\frac{1}{7}$ of James', and both together have 44, how many marbles has each?

96. If one yard of sheeting cost $18\frac{3}{4}$ cents, how many yards may be bought for 1.31\frac{1}{4}$?

97. What is the product of $6 \times \frac{2}{3}$ of $\frac{3}{5}$? $42\frac{3}{10} \times \frac{20}{12}$?

98. What is the product of $17\frac{4}{5} \times 6\frac{3}{4}$? $\frac{3}{4}$ of $\frac{1}{7} \times 18\frac{4}{5}$?

99. What is the product of $\frac{4}{5}$ of $91 \times 71\frac{1}{2}$? $20\frac{1}{4} \times 20\frac{4}{9} \times 25\frac{9}{13}$?

100. What is the product of $\frac{2}{9}$ of $\frac{3}{5} \times \frac{5}{8}$ of $3\frac{2}{7}$? $\frac{3}{4}$ of $\frac{5}{6} \times \frac{4}{5}$ of $\frac{6}{11}$?

101. What is the product of $5 \times \frac{2}{3} \times \frac{2}{7}$ of $\frac{3}{5} \times 4\frac{1}{6}$? $12\frac{3}{5} \times \frac{1}{3}$ of 7?

102. What is the product of $7\frac{1}{2} \times 5\frac{1}{7} \times 8\frac{1}{2} \times 5\frac{1}{4} \times \frac{5}{9}$? $\frac{1}{5} \times \frac{3}{8} \times 5\frac{1}{5} \times \frac{3}{16} \times 5$?

103. What number must be multiplied by $9\frac{3}{8} \times 3\frac{1}{2}$, that the product may be 100?

104. A and B, being 133 miles apart, travel towards each other, both starting at the same time. They meet at the end of 10 hours, and find that A has traveled $1\frac{1}{2}$ miles more than B each hour. How many miles did each travel?

105. A boy in flying his kite lost $\frac{3}{5}$ of the string, then added 65 feet, and found that it was just $\frac{5}{6}$ of the original length. What was the length at first?

106. A man spent $18.81 for equal quantities of butter and lard; for the butter he paid $.18 per pound, and for the lard $.15 per pound. How much of each did he buy?

107. California cultivated in 1869 1,038,647 acres of wheat, which produced 21,500,000 bushels, and 19,200 acres of potatoes, from which 2,400,000 bushels were harvested; what was the average yield per acre of each?

108. Allowing the expense of cultivating an acre of each to be the same, the wheat worth $.95 per bushel, and the potatoes $.70, how much more profitable per acre was the potato than the wheat crop?

109. If $\frac{2}{3}$ of $\frac{4}{9}$ of an acre of land sell for $\$16\frac{48}{100}$, what is 5 times $\frac{1}{2}$ of $\frac{10}{27}$ of an acre worth at the same rate?

110. A farmer being asked how many sheep he had, replied that he had them in 4 fields; in the first there were 5 less than $\frac{1}{2}$ of the whole number of sheep; in the second $\frac{1}{3}$ as many as in the first; in the third $\frac{2}{5}$ as many; and in the fourth there were 30 sheep. How many sheep had he?

111. Find the quotient of $\frac{1}{2}$ of $\frac{2}{3} \div \frac{2}{3}$ of $\frac{3}{4}$; $1\frac{1}{2} \times \frac{3}{4} \div \frac{2}{3}$ of $\frac{1}{8}$.

112. Find the quotient of $\frac{5}{6}$ of $50 \div 4\frac{1}{3}$; $14\frac{7}{12} \div 25$.

113. Find the quotient of $5{,}205\frac{1}{5} \div \frac{4}{5}$ of 91; $3{,}157\frac{1}{2} \div \frac{37}{150} \times 5$.

114. Find the quotient of $476\frac{1}{2} \times \frac{1}{4} \div \frac{3}{4}$ of 7; $5{,}621 \times \frac{5}{7} \div \frac{8}{17}$ of $\frac{17}{8}$.

115. Find the quotient of $(3 - \frac{7}{8}$ of $\frac{2}{7}$ of $\frac{5}{9}) \div 7\frac{5}{12}$; $\frac{2}{7} \div (\frac{5}{28} \times \frac{3}{15} \times 9\frac{1}{3})$.

116. Reduce .35 to an equivalent common fraction.

117. Reduce $\frac{7}{10}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{13\frac{1}{2}}{7}$ to a decimal.

118. What is the sum of $\frac{5}{4}$ of 18, $\frac{8}{11}$ of $\frac{11}{12}$, and $7\frac{4}{9}$?

119. Reduce $\frac{7\frac{2}{3}-4\frac{1}{4}}{\frac{1}{2} \text{ of } 3\frac{5}{6}} \times \frac{7\frac{2}{3}}{31\frac{8}{9}}$ to its simplest form.

120. Bought $\frac{1}{3}$ of $3\frac{15}{16}$ cords of wood for $\frac{2}{5}$ of \$$17\frac{1}{2}$. How much did one cord cost?

121. If 1.75 acres produce 6.51 tons of hay, how many tons will 7.625 acres produce?

122. A man bought $43\frac{3}{4}$ yards of carpeting for \$$58\frac{1}{3}$; he sold $\frac{2}{5}$ of the piece, gaining \$$.16\frac{2}{3}$ on each yard sold. How much did he receive for it?

123. A owns $\frac{3}{11}$ of a cargo worth \$$23{,}426\frac{1}{3}$; B owns $\frac{3}{8}$ of a steamboat worth \$$17{,}425\frac{1}{3}$. They exchange stocks. How much money must A pay to B?

124. Bought 33 baskets of peaches, each basket containing $\frac{3}{4}$ of a bushel, at \$$1.37\frac{1}{2}$ per bushel. What was the cost?

125. From $23\frac{2}{3}$ bushels subtract the sum of $\frac{8}{9}$ and $4\frac{5}{6}$ bushels.

126. A merchant in selling $10\frac{5}{8}$ pounds of sugar at the rate of 8 pounds for \$1, gains 17 cents; what was the cost of the sugar per pound?

127. When potatoes are worth \$$.87\frac{1}{2}$ per bushel, and corn \$$1.16\frac{2}{3}$, how many bushels of corn will a farmer receive in exchange for 28 bushels of potatoes?

128. A and B traded with equal sums of money; A gained a sum equal to $\frac{1}{5}$ of his stock; B lost \$220, and then had $\frac{1}{2}$ as much as A. What was the original stock of each?

129. If a man earn \$56 in $\frac{9}{14}$ of a month, how much does he earn in one week, allowing 4 weeks to a month?

130. James can do a piece of work in $\frac{6}{7}$ of a day; Henry can do it in $1\frac{1}{3}$ days, and John can do it in $\frac{4}{5}$ of a day. How much longer will it take John to do the work alone than it does James and Henry working together?

131. From a piece of calico containing $33\frac{7}{8}$ yards there have been sold, at different times, $11\frac{3}{4}$ yards, $7\frac{5}{8}$ yards, $2\frac{3}{16}$ yards, and $1\frac{1}{2}$ yards. How many yards remain?

132. What number must be multiplied by $\frac{2\frac{3}{5}}{4\frac{1}{2}}$, that the product may equal 1?

133. A merchant has 3 pieces of cloth, containing respectively $28\frac{3}{4}$ yards, $35\frac{1}{2}$ yards, and $41\frac{5}{8}$ yards; after selling several yards from each piece, he finds he has left in the 3 pieces $65\frac{7}{8}$ yards. How many yards has he sold?

134. What number is that to which, if you add $\frac{3}{7}$ of $\frac{8}{11}$ of itself, $\frac{1}{2}$ of the sum will be 101?

135. Texas, in 1869, produced 2,540,300 head of young cattle, and the State of New York 103,097,280 pounds of butter, and 48,545,289 pounds of cheese. Allowing the average value of the cattle to be \$$12\frac{1}{2}$ per head, the butter \$.25, and the cheese \$.09 per pound, how much more were the cattle worth than the butter and cheese?

136. If $\frac{6}{11}$ of a yard of cloth cost \$10, how much will \$$17\frac{1}{2}$ purchase?

137. A merchant sold a piece of cloth for \$24, and thereby lost $\frac{1}{4}$ of his purchase money. What part of his purchase money would he have gained had he sold it for *\$34?*

138. Bought a horse and saddle for $150, and paid for a buggy $\frac{8}{9}$ of what I paid for the horse; the saddle cost $\frac{2}{7}$ the value of the horse. What was the price of each?

139. A company whose capital stock is divided into 1,000 equal shares, consolidate the stock into 300 equal shares. How much larger would a share of the latter be than one of the former?

140. A boy can do a certain piece of work in $3\frac{2}{5}$ days, and a man can do the same in $\frac{4}{7}$ of the time. How many days will both working together require to do the work?

141. In 1856, 4,056,471 votes were cast for three presidential candidates. Buchanan received 497,573 votes more, and Fillmore 467,309 votes less, than Fremont. How many votes did each receive?

142. An Illinois farmer sold $212\frac{6}{7}$ bushels of wheat for $\$201\frac{3}{4}$; $328\frac{7}{12}$ bushels of corn for $\$178\frac{5}{8}$; $187\frac{9}{14}$ bushels of oats for $\$84\frac{7}{9}$. How many bushels of grain did he sell, and how much did he receive for the whole?

143. A having $104\frac{3}{8}$ bushels of wheat, sold $\frac{3}{5}$ of it to B, who sold $\frac{2}{3}$ of what he bought to C, who sold $\frac{1}{4}$ of what he bought to D. How many bushels did each purchase?

144. What is the difference between $\frac{475}{3}$ yards, and 159 whole yards?

145. How much is the half of the fourth part of 7 times 224.56?

146. Sold 10,450 feet of timber for $169.8125, and gained thereby $\$39.18\frac{3}{4}$; how much did it cost per C?

147. If $6.975 be paid for .93 of a hundred pounds of pork, how much will 100 pounds cost?

148. Bought $\frac{3}{4}$ of a ten-acre lot, and sold $\frac{4}{5}$ of what I purchased. How much did I sell?

149. A gentleman bequeathed $\frac{1}{3}$ of his estate to his wife, $\frac{1}{4}$ of the remainder to his oldest son, and $\frac{1}{5}$ of the residue to his oldest daughter, whose share was \$684.66$\frac{2}{3}$. What was the value of the estate?

150. Bought 8 pounds of hyson tea and 12 pounds of black tea. The price per pound of the latter was $\frac{5}{8}$ the price of the former, which was \$$\frac{9}{10}$. What did the whole cost?

151. What will 12.75 bales of cotton cost, each bale weighing 7.75 cwt., at \$28.625 per cwt.?

152. What is the greatest common divisor of 408, 1,190, 1,445, and 4,012?

153. How many times does the sum of 21$\frac{1}{3}$ and 12$\frac{4}{5}$ contain their difference?

154. In a certain school, .375 of the pupils study arithmetic, .3 study grammar, .25 study geography, and the remainder, which is 21, learn to read. What is the whole number of pupils?

155. Four persons bought a house together for \$8,250; B paid twice as much as A, C paid as much as A and B, and D paid as much as A and C. How much did each pay?

156. A farmer sold to a merchant 3 loads of hay weighing respectively 1,826, 1,478, and 1,921 pounds, at \$8.80 per ton, and 281 pounds of pork at \$5.25 per hundred. He received in exchange 31 yards of sheeting at \$.09, 6$\frac{1}{2}$ yards of cloth at \$4.50, and the balance in money; how much money did he receive?

157. If 10 acres of land can be bought for \$545, how many acres can be bought for \$17,712.50?

Add the following ledger columns, first by one, and then by two columns at a time:

******158.*	*159.*	*160.*	*161.*
$42.17	$506.76	$2,371.67	$14,763.84
36.24	194.32	4,571.84	33,276.90
18.42	427.90	1,690.50	47,061.39
10.71	173.26	2,037.69	18,242.76
194.30	71.32	5,094.46	47,364.96
347.16	39.46	876.54	8,410.31
40.00	152.60	679.81	5,724.27
12.94	271.78	155.48	56,317.66
86.73	320.00	4,930.71	81,742.73
271.19	709.08	3,104.13	22,431.27
103.07	48.50	1,987.67	40,163.55
500.50	63.41	5,142.84	32,189.60
7.59	56.00	276.30	7,063.21
11.44	410.10	522.71	3,451.09
81.92	372.22	3,114.60	9,200.00
110.10	137.89	1,776.82	1,807.36
107.09	276.44	7,152.91	56,768.72
207.16	18.19	9,328.42	63,024.27
97.20	27.96	472.19	36,180.45
21.77	157.16	321.42	90,807.08
150.15	94.57	2,423.79	28,763.81
427.26	177.66	1,600.81	37,196.75
316.42	327.40	5,976.27	4,230.61
114.64	1,132.16	4,318.19	3,719.84

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* **Note.**—To add two columns, to the lower number add first the units of the next number above, and then the tens; thus in Ex. 158: 64 + 2 = 66 + 40 = 106 + 6 = 112 + 20 = 132, etc.

162. The distance from Savannah to Macon is 190 miles; A, starting from Macon, travels $\frac{5}{19}$ of the distance; B, starting from Savannah, travels $\frac{1}{2}$ of $\frac{3}{5}$ of the distance in the same time. How far apart are they?

163. Bought a horse for $115. At what price must he be sold so that the gain shall be $\frac{3}{8}$ of the cost?

164. By selling a house for $2,175, my gain was $\frac{8}{17}$ of the cost of the house. What did I pay for the house?

165. A grocer bought a cask of sugar, containing 400 pounds, for $32; a part of it being damaged, he sold the remainder for $\frac{5}{4}$ the cost per pound, and thereby gained a sum equal to $\frac{1}{8}$ of his purchase money. How many pounds were damaged?

166. A man going a journey of 418 miles, finds at the end of 5 days that the distance he has traveled is $\frac{17}{21}$ of the remaining distance. How many miles does he travel per day?

167. A regiment of soldiers, consisting of 1,025 men, is to be furnished with coats, each to contain $2\frac{2}{3}$ yards, $1\frac{3}{8}$ yards wide. How many yards of cloth, $\frac{15}{16}$ yards wide, will line them?

168. How many times is .75 of 2.625 contained in .375 of $26\frac{1}{4}$.

169. A man having a cow and horse found that 4 loads of hay would keep them both 6 months; having disposed of his horse he found that the same quantity of hay would keep his cow 14 months. In what time did each consume 1 load?

170. I sold an article for $\frac{1}{4}$ more than it cost me to A, who sold it to B for $10, which was $\frac{1}{3}$ less than it cost him. *What did it cost* me?

171. Bought a hogshead of molasses containing 128 gallons at $.65 a gallon; paid $.80 for cartage, and lost 16 gallons by leakage. At what price per gallon must the remainder be sold to gain $\frac{1}{5}$ of the entire cost?

172. A merchant bought a bag of coffee, containing 80 pounds, at 15 cents per pound; he also paid $.54 for roasting it. For what must it be sold per pound to yield a profit of $\frac{1}{8}$ the cost of the coffee, allowing $\frac{1}{40}$ of each pound for waste?

173. Bought a cask of nails containing 100 pounds at $4\frac{2}{5}$ cents per pound, and after reserving 15 pounds for myself, I sold the remainder at $5\frac{4}{5}$ cents per pound. How much did I gain?

174. A can do $\frac{1}{3}$ of a piece of work in 4 days; B can do $\frac{1}{4}$ of it in 5 days; C can do $\frac{1}{5}$ of it in 3 days, and D can do $\frac{1}{8}$ of it in $1\frac{1}{2}$ days. How long will it take them all to do it?

175. What is the sum of 45 millionths, 45 thousandths, 45 hundredths, 45 tenths, and 45 units?

176. A man owned seventy-five thousandths of the stock in a bank, and sold three hundred and twenty-five ten-thousandths of the whole stock. How much did he still own?

177. A mast stands $\frac{1}{5}$ in the ground, $\frac{1}{4}$ in the water, and 33 feet above the water. What is its length?

178. A man bought 3 barrels of molasses, containing respectively 30.375, 33.675, and 28.6625 gallons, at an average price of $.375 per gallon. What was the whole cost?

179. What are all the exact divisors of 560?

180. A person after spending $40 more than $\frac{3}{5}$ of his money, had $60 less than $\frac{3}{7}$ of it left. How much money had he?

181. From a cask of rum there were drawn off 26 gallons; $\frac{1}{3}$ of the remainder leaked out; the cask was then found to be 4 gallons more than $\frac{1}{2}$ full. How many gallons did the cask at first contain?

182. A and B have the same income; A saves $\frac{1}{8}$ of his but B spends $1\frac{2}{7}$ times as much as A, and finds himself $98.56 in debt at the end of the year. What is their income?

183. The entire cotton crop of the United States in 1870 was 3,800,000 commercial bales. If the bales averaged 465 pounds, what was the total value of the crop at an average price of 18 cents a pound?

What is the value of the following:

184. 327 feet of boards, at $15½ per M?

185. 672 feet of siding, at $1.62½ per C?

186. 24,240 feet of timber, at $9.37½ per M?

187. 3,700 cedar-rails, at $7¾ per C?

188. 4,200 fence-pickets, at $15 per M?

189. 9,760 bricks, at $9½ per M?

190. 4,528 fire-bricks, at $3 per C?

191. 1,560 feet of lath, at $.90 per C?

192. 675 feet of scantling, at $7.50 per M?

193. 496 feet of boards, at $1.87½ per C?

194. Bought 7,640 bricks, at $4.75 per 1000; 26,789 feet of lumber, at $2.75 per 100; and 986 feet of pine boards, at $20 per 1000; I paid $.35 per 1000 for planing 23,463 feet of boards. What was the whole bill?

Find the value of the following:

195. 2,840 pounds of hay, at $12.50 per ton.

196. 3,156 pounds of plaster, at $5½ per ton.

197. 175 pounds of hay, at $18¼ per ton.

198. 140 sacks of guano, each containing $162\frac{1}{2}$ pounds, at \$$17\frac{3}{4}$ per ton.

199. $842\frac{3}{4}$ tons of railroad iron, at \$66.44 per ton.

200. 2,480 peach trees, at \$$16\frac{1}{2}$ per hundred.

201. 840 pounds of beef, at \$$4\frac{5}{8}$ per hundred pounds.

202. The freight on 18,962 pounds of pork, at \$10 per ton.

203. The freight on 3,840 pounds, at \$.96 per hundred pounds.

204. A speculator gave \$19,550 for horses, and sold a certain number of them for \$8,925, at \$105 each; by so doing he lost \$10 apiece. For how much must he sell the remaining horses, to gain \$425 by the operation?

205. A farmer exchanged 50 loads of wood, each containing $\frac{3}{4}$ of a cord, at \$4.40 per cord, for an equal number of bushels of corn, worth \$.75 a bushel, and of oats, worth \$.57 a bushel. How many bushels of each did he receive?

206. A and B can perform a piece of work in $1\frac{5}{7}$ days; A and C in 2 days; C and B in $2\frac{2}{5}$ days. In what time would each perform the work alone, and how long would it take them to do the work together?

207. If $\frac{7}{9}$ of a yard of cloth cost \$$\frac{7}{25}$, what will $\frac{5}{6}$ of a yard cost?

208. The number of stamped envelopes sold in one year was as follows: three-cent envelopes, 22,940,100; one-cent, 2,845,000; four-cent, 70,000; six-cent, 40,450; ten-cent, 131,750; allowing 5 cents as the cost of paper and manufacturing every package of 25 envelopes, what was the whole number sold and their value?

209. How many bushels of corn must a farmer carry to mill that he may bring back $3\frac{3}{4}$ bushels, provided the miller takes $\frac{1}{16}$ for toll?

210. Reduce $\frac{321771}{360429}$ to its lowest terms.

211. What is the smallest sum of money with which I can purchase either sheep at $3.50 a head, calves at $10.50, cows at $35, oxen at $70, or horses at $105 ?

212. A and B, traveling together, started with such sums of money that $\frac{1}{9}$ of A's was equal to $\frac{1}{13}$ of B's; each spent $12, when $\frac{1}{3}$ of A's money was equal to $\frac{1}{5}$ of B's. How much did each start with ?

213. The point in the earth's orbit farthest from the sun is 96,600,000 miles; the point nearest, 93,400,000 miles; of the moon from the earth the farthest, 256,760 miles; the nearest, 221,290 miles. What are the greatest and least possible distances between the sun and the moon ?

214. Required the footing of the following bill:

NEW YORK, Sept. 4, 1871.

MR. JOHN C. SMITH,

Bo't of HILL, GROVES & CO.,

10	yd.	Cassimere,	@ $2.85	
16	"	Blk. Silk,	" 1.12½	
72	"	Ticking,	" .14	
42	"	Bld. Shirting,	" .16½	
12	"	Pressed Flannel,	" .40	
24½	"	Scotch Plaid Prints,	" .56	
				$

Rec'd Payment,

HILL, GROVES & CO.

215. A has 6.4 acres in one lot, and 8.75 in another; B has 4.375 acres less than 3 times as much as A; C has 7.2875 acres less than ½ as much as A and B together. *How many acres had* B and C ?

216. Reduce $\frac{5}{7}$, $\frac{8}{13}$, $\frac{11}{42}$, $\frac{9}{52}$, and $\frac{15}{78}$ to their least common denominator.

217. A has \$647, which lacks \$33 of being 4 times what B has; C is worth twice as much as A and B together, lacking \$72. How much money have B and C respectively?

218. A merchant bought a number of bushels of corn; having sold 6 bushels more than $\frac{1}{4}$ of it to W. Smith, and 8 bushels more than $\frac{2}{3}$ of the remainder to J. Acker, he had 20 bushels remaining. How many bushels did he buy?

219. A market woman wished to sell a basket of oranges; her first customer bought $\frac{1}{3}$ of what she had, and gave her back 5; the second bought $\frac{1}{5}$ of what she then had, and gave her back 10; the third bought $\frac{1}{6}$ of the remainder, and gave her back 15; the fourth bought $\frac{3}{4}$ of the residue, and gave her back 20; after which she found she had 60 oranges left. How many had she at first?

220. If $\frac{5}{9}$ of $\frac{2}{3}$ of $\frac{4}{5}$ of $\frac{7}{8}$ of a ship be worth $\frac{2}{9}$ of $\frac{14}{19}$ of $\frac{19}{25}$ of $\frac{5}{12}$ of her cargo, how many times the value of the ship is her cargo worth?

221. I exchanged 30 barrels of molasses, each containing 34 gallons, at \$.56 a gallon, for 17 chests of tea of 24 pounds each. How much did the tea cost me per pound?

222. From a cistern containing 3,465 gallons, 62.75 barrels, of 31.5 gallons each, were drawn off. How many gallons remained?

223. Bought a quantity of lumber for \$785$\frac{3}{16}$, and of wood for \$347$\frac{2}{3}$; sold the lumber for \$649$\frac{4}{5}$, and the wood for \$589$\frac{7}{9}$. How much did I gain?

224. How many bushels of potatoes at \$$\frac{7}{8}$ per bushel, will pay for 6$\frac{3}{7}$ bushels of wheat at \$1.40 per bushel?

225. A man being asked his age, replied, "If $\frac{1}{3}$ of my age be multiplied by 11, and $\frac{4}{9}$ of it be multiplied by 15, and $\frac{1}{4}$ of it be added to the sum of these products, the sum will be 381." What was his age?

226. The less of two numbers is $\frac{54\frac{3}{5}}{\frac{1}{5} \text{ of } 8\frac{2}{3}}$, and their difference $\frac{1\frac{5}{9}}{\frac{9}{16}}$; what is the greater number?

227. What number multiplied by $\frac{2}{9}$ of $\frac{5}{8} \times 3\frac{2}{7}$ will produce $\frac{2}{8}\frac{3}{4}$?

228. If .125 of an acre of land is worth \$$15\frac{7}{8}$, how much are 25.42 acres worth?

229. How many bushels of oats worth \$$\frac{2}{5}$ a bushel will pay for $\frac{2}{3}$ of a barrel of flour at \$$7\frac{1}{3}$ a barrel?

230. What will $\frac{1}{2}$ of $10\frac{7}{8}$ cords of wood cost, at $\frac{4}{29}$ of \$42 per cord?

231. Three hundred seventy-five thousandths of a lot of dry goods, valued at \$4,000, was destroyed by fire; how much would a firm lose who owned .12 of the entire lot?

232. Reduce $\left(\frac{1\frac{3}{4}}{4\frac{1}{2}} \div \frac{2\frac{1}{3}}{2\frac{1}{4}}\right) \times \frac{4}{5}$ of $\frac{1}{2}$ to a decimal.

233. A farmer exchanged $28\frac{1}{2}$ bushels of oats, worth \$$.37\frac{1}{2}$ a bushel, and 453 pounds of mill feed, worth \$.75 per hundred, for 12,520 pounds of plaster; how much was the plaster worth per ton?

Reduce to their simplest forms the following:

234. $29.396 \times .0027$; $.0099 \times .0078$.

235. $3.1416 \times .7854$; $12,470 \times .0006$.

236. $.07504 \div .0032$; $.07 \div .04375$.

237. $971.7 \div 3,075$; $13.44 \div .35$.

238. $7\frac{1}{4}$ of $3\frac{1}{2}\times 6\times 5\frac{1}{4}$; $\dfrac{\frac{3}{5}\text{ of }14}{\frac{1}{9}\text{ of }15}\times 37\frac{1}{2}$.

239. $9\frac{7}{9}$ of $8\times\dfrac{\frac{1}{15}}{\frac{16}{17}}$; $19\frac{3}{5}$ of $\frac{6}{11}$ of $14\div 31\frac{3}{15}$.

240. $\dfrac{\frac{1}{9}\text{ of }\frac{6}{7}}{\frac{3}{4}\text{ of }\frac{1}{2}}+\dfrac{\frac{5}{12}\text{ of }\frac{3}{4}}{\frac{1}{9}\text{ of }\frac{7}{8}}$; $(24\times\frac{8}{9}\text{ of }7)+(\frac{5}{6}\text{ of }3\times\frac{4}{15})$.

241. $\dfrac{\frac{1}{2}\text{ of }7\frac{3}{4}}{\frac{3}{4}\text{ of }\frac{1}{7}}+\dfrac{\frac{1}{4}\text{ of }\frac{1}{3}}{\frac{1}{3}\text{ of }4\frac{3}{7}}$; $\dfrac{16\frac{4}{7}\text{ of }\frac{1}{12}}{8\frac{2}{7}\text{ of }1\frac{1}{2}}\div\dfrac{8\frac{1}{6}\text{ of }\frac{1}{4}}{16\frac{1}{6}\text{ of }\frac{7}{12}}$.

242. $(\frac{10}{11}-\frac{8}{9})\times(\frac{5}{7}+\frac{3}{4})\times(\frac{2}{3}-\frac{1}{2})$; $(5\frac{1}{3}+8\frac{1}{6}-5\frac{1}{2})\times(3\frac{1}{3}+5\frac{1}{15}+9\frac{1}{3})$.

243. $6\frac{3}{4}\times 1\frac{3}{8}\times(15\frac{7}{12}-3\frac{1}{4}+5\frac{1}{2})$; $284\frac{3}{4}\times\frac{16}{19}\times(\frac{5}{9}-\frac{3}{7}-\frac{1}{15})$.

244. $(\frac{5}{7}\text{ of }\frac{3}{4}\text{ of }2+5-3)\times\dfrac{\frac{3}{7}\text{ of }\frac{6}{11}}{4}\times 8\frac{1}{2}\times 4$; $\dfrac{\frac{5}{9}\text{ of }\frac{3}{7}}{6\frac{1}{5}-5\frac{4}{15}}$.

245. $(5\frac{1}{7}+\frac{8}{11}-3\frac{1}{9}+6\frac{3}{4}+\frac{9}{11})\div\frac{5}{6}\text{ of }\frac{1}{8}$; $\dfrac{\frac{2}{3}\times\frac{11}{12}}{\frac{1}{18}\times 5\frac{1}{2}}$.

246. Change $\frac{7}{9}$ of $\frac{5}{7}$ to an equivalent fraction having 135 for its denominator.

247. Reduce $\frac{3}{4}$, $\frac{1}{6}$, $\frac{5}{8}$, and $\frac{1}{12}$ to equivalent fractions, whose denominators shall be 48.

248. Find the least common denominator of $1\frac{1}{3}$, $\frac{6}{7}$, 2, $\frac{7}{10}$, $\frac{2}{3}$ of $\frac{4}{5}$, $\frac{4}{9}$ of $\frac{1}{4}$.

249. The sum of $\dfrac{\frac{2}{3}\text{ of }\frac{3}{4}}{\frac{1}{2}}$ and $\dfrac{\frac{2}{5}\text{ of }\frac{5}{6}}{\frac{2}{9}\text{ of }4\frac{1}{2}}$ is equal to how many times their difference?

250. A man dying, left to his oldest son $\frac{1}{3}$ of the estate, increased by $\frac{1}{10}$ his daughter's share; to his youngest son $\frac{1}{3}$ of the estate plus $\frac{1}{8}$ of his daughter's share; and to his daughter the remainder, which was \$700 less than the younger son's share. What was the value of the estate?

251. What number is that whose sixth part exceeds its eighth part by 20 less than its ninth part?

252. What number is that whose $\frac{1}{3}$ part being subtracted from its $\frac{1}{2}$, the remainder will be 4 less than $\frac{1}{4}$ the number?

253. A speculator sold a quantity of grain for $96, and gained $\frac{1}{7}$ of what it cost him. What part of the cost would his gain have been had he sold it for $100?

254. A coal dealer sold 5 tons of coal for $57.50, which was $\frac{5}{8}$ as much as he received for all he had left at $$7.66\frac{2}{3}$ per ton. How many tons did he sell?

255. A farmer sold, in one year, 150 bushels of oats at $.45 per bushel; 250.25 bushels of corn at $.875 per bushel; 75.75 cords of wood at $3.625 a cord; $645\frac{2}{3}$ pounds of wool at $.78 per pound; 23 head of cattle at an average price of $50.75 per head. How much did he receive for the whole?

256. A grocer has forgotten the weight and first cost of a box of coffee; he only recollects that if he had sold it at 28 cents a pound he would have gained $2.00, but if he had sold it at 21 cents a pound he would have lost $5.00. Required the number of pounds in the box and the first cost per pound.

257. The sum of $\frac{\frac{3}{5} \text{ of } \frac{5}{6}}{.5}$ and $\frac{\frac{4}{7} \text{ of } \frac{7}{12}}{\frac{4}{9} \text{ of } 2.25}$ is equal to how many times their difference?

258. If $3\frac{3}{11}$ tons of coal will last as long as $4\frac{10}{11}$ cords of wood, how many tons of coal will last as long as $13\frac{7}{11}$ cords of wood?

259. A merchant expended $384 for an equal number of yards of six different kinds of broadcloth, costing respectively $2.00, $3.00, $3.50, $4.00, $4.50, $7.00 per yard. How many yards of each kind did he buy?

260. The difference between two numbers is 8, and $\frac{1}{11}$ of the larger is equal to $\frac{1}{7}$ of the smaller. What are the numbers?

261. A and B can do a piece of work in $6\frac{2}{3}$ days; B and C in 12 days; and A and C in 10 days. In how many days can all working together do it?

262. A trader bought corn at \$.63 a bushel, and sold it at \$.56. How much did he lose on every dollar he paid?

263. How long will it take a man to walk 486 miles, if he walk $3\frac{3}{8}$ miles an hour, and $7\frac{1}{5}$ hours each day?

264. A tree, by falling, was broken into 3 pieces; the top part was 15 feet long; the bottom, as long as the top and $\frac{1}{2}$ the middle piece; and the middle piece as long as the top and bottom. What was the height of the tree?

265. What number is that which being increased by $\frac{3}{4}$ of $\frac{7}{12}$ of $\frac{8}{21}$ of itself, will amount to $247\frac{1}{8}$?

266. Six men can do a piece of work in $7\frac{2}{3}$ days. How soon after beginning must they be joined by 2 more, so as to complete it in $5\frac{2}{9}$ days?

267. Bought a western farm for \$11,180, and after expending \$871 in improvements, I sold one-half of it for \$7,740, at \$18 per acre. How many acres of land did I purchase, and at what price?

268. How many times is the greatest common divisor of $4\frac{1}{3}$, $6\frac{1}{2}$, $7\frac{2}{9}$, and $7\frac{7}{12}$ contained in the least common multiple of the same numbers?

269. When \$1 of gold is worth $\$1.59\frac{1}{2}$ in paper, how many dollars in gold ought a broker to pay for a ten-dollar U. S. note, and how much fractional currency?

270. Divide \$14,500 between A and B, so that A shall have $\frac{7}{8}$ as much as B, increased by \$2,500.

271. Twelve men can do a piece of work in $8\frac{5}{6}$ days; how many days may 3 remain away, and yet finish the work in the same time, by bringing 7 more with them?

272. In a lot of silver change, worth $13.50, $\frac{2}{9}$ of the value is in 50-cent pieces, $\frac{4}{7}$ of the remainder in 25-cent pieces, and the rest is made up of 10-cent, 5-cent, and 3-cent pieces, of each an equal number. How many pieces of each coin are there?

273. Divide the sum of $\frac{1}{6}$ of $\frac{4}{7}$ of $28\frac{3\frac{6}{7}}{4\frac{2}{7}}$ and $3\frac{39\frac{1}{2}}{105}$ by the continued product of $\frac{34\frac{4}{5}}{27}$, $\frac{98\frac{1}{8}}{87\frac{2}{9}}$, $\frac{2\frac{1}{3}}{\frac{7}{8}}$, and $\frac{128}{81\frac{5}{11}}$.

274. John and James started together and ran a race; when James had run 80 rods, $\frac{1}{17}$ the distance John had run was equal to the distance he was ahead of James. How much did John gain on James in running 80 rods?

275. Bought 7.5 pounds of sugar for $.37½. For how much must I sell 5.25 pounds to gain the cost of .25 of a pound?

276. A man laid out $\frac{3}{7}$ of his fortune in speculation, and put out on interest the remaining $6,800; at the end of the year he had gained $\frac{5}{17}$ as much by speculation as he laid out, and his interest was $\frac{1}{8}$ of the principal. What was his fortune, and how much did he gain during the year?

277. A man bought 2,400 bushels of corn, at $.90 a bushel, but in measuring it he found that he had more bushels than he paid for, and that he had gained 2.25 bushels for every hundred. He sold the same without delay at $1.05 a bushel. How much did he make by the transaction?

278. A boy spent one-third of his money for apples, and 20 cents for nuts; he then gave 10 cents more than one-fourth of the remainder for oranges, when he found he had but 50 cents left. How many cents had he at first?

279. A had $\frac{2}{5}$ of $\frac{5}{6}$ of $3\frac{3}{4}$ times $31,448, and paid $\frac{3}{7}$ of $\frac{1}{3}$ of $\frac{7}{10}$ of it for a farm. How much money had he remaining?

280. Bought a bale of cloth for $96.75, and disposed of it for $\frac{2}{3}$ the cost, by which I lost $1.00 on a yard. How many yards were there in the bale?

281. At $$\frac{7}{8}$ per yard, how many yards of silk may be bought for $$15\frac{3}{4}$?

282. How much must be paid for the transportation of 17,864 pounds of pork from Cincinnati to New York, at $$9\frac{1}{2}$ a ton?

283. What is the value of the following expression :

$$\tfrac{2}{3} \text{ of } \frac{7\frac{1}{2}}{5} + \left(\frac{\frac{1}{4}}{3.7} \div \tfrac{2}{5} \text{ of } \left(9\tfrac{2}{7} - \frac{8}{2.15} + \frac{6.1}{\frac{4}{9}}\right)\right) - \left(\frac{\frac{3}{11}}{4\frac{2}{13}} \times \frac{22}{39}\right)?$$

284. A man divided $670 among his 3 sons, so that $\frac{1}{3}$ the share of the first was equal to $\frac{3}{4}$ the share of the second, and to $\frac{4}{5}$ the share of the third. Required the several shares.

285. A father divided a piece of land among his three sons. To the first he gave 16.25 acres; to the second, $\frac{5}{12}$ of the whole; and to the third as much as to the other two. How many acres had the third?

286. If 35 yards of cloth cost $122.50, what will be the cost of 29 yards?

287. A miller paid $54 for grain, $\frac{3}{10}$ of it being barley at $$.62\frac{1}{2}$ per bushel, and $\frac{3}{5}$ of it wheat at $$1.87\frac{1}{2}$ per bushel; the balance of the money he expended for oats at $$.37\frac{1}{2}$ per bushel. How many bushels of grain did he purchase?

288. If $3\frac{1}{4}$ yards of cloth, $1\frac{3}{5}$ yards wide, cost $\$3.46\frac{2}{3}$, what will be the cost of $42\frac{1}{4}$ yards, $1\frac{1}{2}$ yards wide?

289. How much is the freight on 3,840 pounds from New York to Baltimore, at $.96 per 100 pounds?

290. What is the value of 9 pieces of broadcloth, each piece containing $27\frac{2}{3}$ yards, worth $\$2\frac{7}{8}$ a yard?

291. If 1 pound of tea be worth $\$.62\frac{1}{2}$, what is .8 of a pound worth?

292. A person having $27.96, was desirous of purchasing an equal number of pounds of tea, coffee, and sugar; the tea at $\$.87\frac{1}{2}$, the coffee at $\$.18\frac{3}{4}$, and the sugar at $\$.10\frac{1}{4}$. How many pounds of each could he buy?

293. If a man travel 13,543.47 miles in $365\frac{1}{4}$ days, how far does he travel in $\frac{7}{8}$ of a day?

294. What will be the cost of 2,172 pounds of plaster, at $3.875 a ton?

295. What cost $\frac{5}{8}$ of 456 bu. of potatoes at $\$.37\frac{1}{2}$ a bu.?

296. If $32\frac{1}{2}$ barrels of apples cost $81.25, what is the price per barrel?

297. What must be paid for 24,240 feet of timber worth $\$9,37\frac{1}{2}$ per M?

298. At $\$5\frac{5}{8}$ an acre, how many acres of land can be bought for $\$4,234.37\frac{1}{2}$?

299. Bought 24 tons of hay, at $16.50 per ton, for $\frac{2}{3}$ of which I paid in sheep, at $\$3\frac{2}{3}$ each, and for the remainder, in butter, at $\$.19\frac{1}{5}$ per pound. How many sheep and how much butter did it require to pay the debt?

300. Bought 17 chests of tea, each containing 59 pounds, at $.67 a pound, and gave in exchange 118 bags of wheat, each containing 3.4 bushels. What was the value of the *wheat per* bushel?

CHAPTER IV.

In addition to, and in combination with the subjects involved in the preceding chapters, Compound and Denominate Numbers, Integral and Fractional, and also Proportion, will be included in the examples of this chapter.

MENTAL EXERCISES.

1. What will $\frac{3}{5}$ of a ton of hay cost, at 80 cents a cwt.?

2. At 10 cents a pint, how much will $\frac{1}{2}$ bu. cherries cost?

3. How many ounces in $1\frac{3}{4}$ lb. silver? in $3\frac{1}{2}$ lb. sugar?

4. How many leap years in every century?

5. How many quart boxes will 2 pk. 6 qt. of berries fill?

6. What will $\frac{5}{8}$ of a gallon of wine cost at 40 cents a pint?

7. Paid 15 cents for 6 lb. of flour; how much was that per cwt.?

8. What is $\frac{5}{8}$ of a pound of gold dust worth at $10 per ounce?

9. How many square yards in 37.6 sq. ft.? 72.5 sq. ft.?

10. If 9 lb. of sugar cost $.75, what will 12 lb. cost?

11. What part of 40 is 8? what is the ratio?

12. What part of 30 is 27? what is the ratio?

13. What part of $\frac{4}{5}$ is $\frac{2}{3}$? what is the ratio?

14. If a mechanic earn $13\frac{1}{2}$ shillings in $1\frac{1}{2}$ days, how much can he earn in a week?

15. At 6 shillings a pair, how many pairs of shoes can be bought for 2 sovereigns 2 shillings?

16. How many square yards in a floor 15 ft. by 12 ft.

17. Reduce 84 gills to units of a higher denomination.

18. How many single things in $\frac{1}{2}$ a gross? in $\frac{3}{8}$? in $\frac{3}{4}$?

19. How much wood in a pile 12 ft. long, 18 ft. high, and 6 ft. wide, and what is its value at $8 per cord?

20. If 5 men can build a barn in 8 days, how many men would be required to build it in 1 day? in 4 days?

21. How much must I pay for a piece of land 20 rd. by 40 rd., at the rate of $250 per acre?

22. At a cent a sheet, what will be the cost of 2 quires of paper? 5 quires? 8 quires? 1 ream?

23. If I walk at the rate of 3 miles an hour, what part of a day will be required to walk 24 miles? 36 miles? 27 miles?

24. How many square feet in 4 sq. rds., 3 sq. yds.? in 4.5 sq. yds.?

25. Reduce 10 oz. 4 pwt. to the fraction of a pound?

26. How many square feet in a board 10 feet long and 18 in. wide?

27. What part of 5 is $\frac{2}{3}$? of $2\frac{4}{5}$ is $1\frac{2}{3}$?

28. What part of $\frac{7}{10}$ is 5? of $25 is $5? of 1 da. is 3 hr.?

29. What part of 3 lb. is 10 oz.? 1 lb. 6 oz.? $2\frac{1}{4}$ lb.?

30. Reduce .75 of a yard to feet and inches.

31. .35 of a bushel to units of lower denominations.

32. 1.25 pecks are how many quarts?

33. *.72 of an inch* is what decimal of a foot?

34. If \$7¼ will buy 3¼ cords of wood, how many cords can be bought for \$10½?

35. If 12 laborers perform a piece of work in 15 days, working 8 hours a day, how many days will be required to perform the same work if they work 10 hours a day?

36. A school-yard containing 300 sq. ft. is 15 ft. wide; what is its length?

37. How long must a box be that is 4 ft. wide and 3 ft. deep, to contain 108 cu. ft.?

38. How many steps, each 2 ft. long, will a person take in walking 6 rd. 3 yd. 2 ft.?

39. At 6 cents a pound, what will 2 cwt. 10 lb. of beef cost? 3¼ cwt.? 3.7 cwt.?

40. What part of 1 hhd. is 7 gal.? 15 gal.? 21 gal.?

41. .025 of a league is what decimal of a mile?

42. Reduce .04 of a pound Troy to units of a lower denomination?

43. What part of 5 gal. is 3 qt.? 1 gal. 1 qt.? 2⅔ gal.?

44. What part of 7 mi. is ¾ of 8 mi.? 3 mi. 4 fur.? 5¼ mi.? 6.75 mi.?

45. What will 3 gross and 6 buttons cost at 10 cents a dozen?

46. If a school be closed 5 mo. 20 da. during the year, what fraction of the year is it closed, and what part in session?

47. What part of an acre is a village lot that is 6 rd. front and 10 rd. deep?

48. If 3 cord feet of wood cost \$3¼, what will 2 cords cost? 3.5 cords? 4½ cords?

49. If 5 horses eat 1½ tons of hay in 1 month, how many tons will 6 horses eat in 2⅔ months?

50. Put 5 gal. 2 qt. 1 pt. of maple syrup into pint and quart bottles, using 2 times as many of the latter as of the former; how many bottles of each size must be used?

51. How many days from the first day of June to the first day of October?

52. What part of an inch is $\frac{3}{40}$ of a foot? .025 of foot?

53. What part of a pound is $\frac{4}{5}$ of a penny? 2.5d.? 1.25d.? 4d.? $12\frac{1}{2}$d.?

54. How many meters in a dekameter? in a hectoliter? a kilometer?

55. How many liters in a dekaliter? in a kiloliter?

56. What part of a gram is a milligram? 25 milligrams?

57. What is the difference in the cost of 15 bushels of oats at 6 dimes a bushel, and 10 yards of cloth at $.80 a yard?

58. If you draw 10 gal. 3 qt. 1 pt. from a hogshead of molasses, how much will remain?

59. Which will cost the most, 5 cwt. of fish at 8 cents a pound, or 3 tons of hay at $.50 a cwt.

60. How many days will it take 5 men to earn $$11\frac{2}{3}$, if 3 men earn $$\frac{7}{8}$ in $\frac{1}{4}$ of a day?

61. Bought a barrel of vinegar for $12, and sold it at 20 cents a quart; how much was gained?

62. Into how many building lots can 5 A. be divided, each containing .25 of an acre?

63. How many liters in 5 hectoliters? 8.5?

64. How many decigrams in one dekagram? in 5? 7? 8? 9?

65. *How many* centiares in 5 ares? 6? 8? 10?

66. How many yards of cloth $\frac{7}{8}$ yd. wide will line $23\frac{1}{3}$ yd. that is $1\frac{1}{4}$ yd. wide

67. What will 1,260 pounds of wheat cost at $\$1\frac{1}{2}$ a bushel? at $\$2\frac{3}{7}$ per bushel?

68. What is $\frac{1}{2}$ of 1 year 5 mo. 3 w. 5 d.? of £7 3s. 6d.?

69. What will 1 mile of telegraph wire cost at 5 cents a foot? at 10 cents a yard?

70. How many yards of carpeting 1 yd. wide will be required to cover a hall 6 ft. wide and 15 ft. long?

71. How many times will $4\frac{3}{4}$ gallons of camphene fill a vessel that holds $\frac{1}{2}$ of $\frac{2}{3}$ of 1 gallon?

72. Bought $\frac{1}{3}$ of $7\frac{1}{2}$ cords of wood for $\frac{1}{4}$ of \$32; what did 1 cord cost?

73. If a man walk 7 mi. in 2 hr., how far can he walk in 3 da., by walking 10 hr. a day?

74. If 3 pk. of grass-seed cost 14s., how much will 4 qt. cost? 6 qt.? 12 qt.?

75. If 3 yd. of velvet cost $\$5\frac{1}{4}$, how much more than \$9 will 6 yd. cost?

76. A, B, and C can build a wall in 5 da.; B and C can do it in 8 da. In what time can A do it alone?

77. If 3 furnaces consume $12\frac{1}{4}$ tons of coal in 7 days, how long will $17\frac{1}{2}$ tons last 5 furnaces?

78. What cost 3 gross of pens, at 6 cents a dozen?

79. If 1 bushel of walnuts cost \$1.60, what will be the cost of 6 quarts?

80. At 20 cents a square foot, what will be the cost of a piece of land 20 feet by 40 feet?

WRITTEN EXAMPLES.

1. A grocer in packing 6 dozen dozen eggs, broke half a dozen dozen, and sold the remainder at 20 cents a dozen. How much did he receive for the eggs?

2. What are 30 hogsheads of molasses worth at $.75 a gallon, if each hogshead contains 68 gallons?

3. A speculator paid $6,569.64 for a quantity of wheat; he sold 1,480 bushels at $2 a bushel, and the remainder stood him in $1.42 a bushel. How many bushels did he purchase?

4. If 28 men build a bridge in $4\frac{6}{7}$ days, how many men could build the same in $2\frac{2}{3}$ days?

5. How much land in New York at $2.25 per square foot will $200,000 buy?

6. A school-room which is 36 ft. long, 30 ft. wide, and 12 ft. high, is occupied by 80 pupils, each breathing 10 cu. ft. of air in one minute. In how long a time will they breathe as much air as the room contains?

7. If 7 men or 11 boys can perform a piece of work in 28 days, in what time can 11 men and 7 boys do the same?

8. A physician bought by Avoirdupois Weight, 15 lb. of opium at 64 cents an ounce, and sold the same by Apothecaries' Weight, in doses of 10 grains each, for 25 cents per dose. How much did he gain?

9. How many yards of carpeting $1\frac{1}{8}$ yd. wide would be required to carpet a room $6\frac{1}{4}$ yd. long and $5\frac{2}{3}$ yd. wide?

10. A grocer exchanged 112.5 lb. of coffee for tea at $.875 per lb., the price of $3\frac{8}{9}$ lb. of coffee being equal to that of 2 lb. of tea. How many pounds of tea did he *receive,* and what was the price of his coffee per pound?

11. If a cubic foot of granite weigh 168.48 pounds, what will be the weight of a block of granite 10.75 feet long, 4.5 feet wide, and 3.8 feet thick?

12. According to statistics obtained in 1870 the area and population of parts of the globe were as follows:

Country.	Square Miles.	Inhabitants.
American Continent	15,873,478	84,365,241
North America	8,637,167	50,931,242
South America	6,954,131	26,677,419
Asia	17,112,526	782,129,318
Europe	3,860,253	295,803,933
Africa	11,556,663	192,523,536

Which has the greater average number of inhabitants to the square mile, North or South America, and how many?

13. Which the greater number of inhabitants to the square mile, Europe or Asia, and how many?

14. How many more square miles and inhabitants has Africa than North America, and how many more to the square mile?

15. How many times more inhabitants has Europe to the square mile than North America?

16. Alaska contains 577,390 square miles. The United States Government paid Russia for it $7,200,000. What was the cost per square mile and per acre?

17. The Duke of Wellington was born May 1, 1769, and died Sept. 14, 1852. Napoleon Bonaparte was born Feb. 5, 1768, and died May 5, 1821. How old was each at the date of the battle of Waterloo, June 18, 1815? How old was each at the time of his death?

18. If the consequent be $6.12½ and the ratio 25, what is the antecedent?

19. If the antecedent be 13 A. 145 P. and the ratio $\frac{42}{89}$, what is the consequent?

20. Find the reciprocal of the ratio of 42 to 28.

21. Find the reciprocal of the ratio of 3 qt. to 43 gal.

22. A man having a hogshead of molasses, sold $\frac{4}{13}$ of it to A, $\frac{1}{3}$ of the remainder to B, and $\frac{1}{3}$ of the residue to C. How many gallons remained?

23. What is the value of $\frac{9\frac{7}{11}}{1\frac{29}{77}}$ of a dollar?

24. Bought 78 A. 135 P. 7 sq. yd. 5 sq. ft. 9 sq. in. of land at $80 per acre; I sold $\frac{2}{5}$ of it to A at $120 per acre; $\frac{2}{3}$ of the remainder to B at $1.00 per sq. rd., and the residue to C at $.005 per sq. ft. What was my whole gain?

25. A fruit dealer bought 4 barrels of cranberries, each containing $2\frac{1}{2}$ bushels, at $8.00 per barrel; he retailed the same at $12\frac{1}{2}$ cents per quart, wine measure. How much was his profit?

26. Reduce 20 reams, 16 quires, 16 sheets, to sheets; 4 lb. 1 oz. 1 pwt. 3 gr., to grains.

27. Reduce 28 P. 12 sq. yd. 4 sq. ft. to sq. in.; 8 S. 18° 40′ to minutes.

Reduce—

28. ℔ 3 ℥ 9 ʒ 4 ℈ 2 to grains; 6,145,920 in. to miles.

29. 4 tuns, 3 hhd. 51 gal. to pints; 128,000 far. to £.

30. 75 A. 4 sq. ch. 18 P. 118 sq. l. to sq. links.

31. 20,981.6 grains to pounds Troy; $6,407\frac{1}{4}$ pt. to bushels.

32. 2,500 fathoms to miles; 150 million to great gross.

33. Divide $870 among A, B, and C, so that $\frac{1}{2}$ of A's money shall be equal to $\frac{2}{3}$ of B's, or $\frac{3}{4}$ of C's.

34. A teacher spends $\frac{3}{5}$ of his salary in board for himself and family, $\frac{1}{10}$ in clothing himself, his wife's clothing costs $\frac{5}{7}$ as much as his own, his daughter's $\frac{1}{2}$ as much as his wife's, his son's $\frac{4}{5}$ as much as his daughter's, and he lays by $115. What is his salary?

35. If 3 horses eat $2\frac{4}{7}$ bushels of oats in 2 days, how many horses will eat $34\frac{2}{7}$ bushels in 8 days?

36. Divide 637 A. 128 P. 11 sq. yd. 4 sq. ft. 16 sq. in. by 16.

37. A man has 4 pieces of land containing 4 A. 140 P., 6 A. 132 P., 9 A. 120 P., and 11 A. 112 P. respectively. It is required to divide each piece into the largest sized lots possible, each lot containing the same area and an exact number of square rods. How much land will each lot contain?

38. Multiply 49 gal. 2 qt. 1 pt. by 12.

39. Multiply 16 yd. $2\frac{4}{5}$ in. by 21.

40. Multiply 106 A. 106 P. 20 sq. yd. 1 sq. ft. 72 sq. in. by 150.

41. Divide $40\frac{1}{2}$ cords by 12.

42. Divide 97 T. 11 cwt. 86 lb. 10 oz. by 73.

43. Multiply 337 yd. 1 ft. $7\frac{1}{4}$ in. by $\frac{3}{5}$.

44. Divide 336 bu. 3 pk. 4 qt. by 4 bu. 3 pk. 2 qt.

45. Multiply $56\frac{1}{2}$ rd. by 24.6 rd.

46. Multiply 40 ft. 11′ 4″ by 4 ft. 6′.

47. Divide 11 hhd. 25 gal. 1 pt. 2.4 gi. by 4.8.

48. Divide 29 ft. 5′ 4″ by 4 ft. 5′.

49. Bought 2.125 yards of cloth, 1.375 yards wide, for $4.675; what will 27.625 yards, $1\frac{7}{8}$ yards wide, cost at the same price per square yard?

50. If $8\frac{2}{3}$ ounces of bread are bought for .06½, when wheat is $\$1\frac{1}{4}$ per bushel, how much bread may be bought for $.25 when wheat is $\$\frac{7}{8}$ per bushel?

51. If 14 men can perform a job in 27 days, in how many days can they perform the same labor with the assistance of 7 more men?

52. A and B pay $2.25 for a barrel of apples, and 20 cents for the barrel; A contributes $1.25 and B the remainder. They divide the apples equally, and A takes the barrel. Which owes the other, and how much?

53. If a town 4 miles square be equally divided into 62 farms, how much will each farm contain?

54. From the sum of $5\frac{7}{12}$ A., $\frac{2}{3}$ of $6\frac{1}{4}$ A., $\frac{3}{16}$ A., and $\frac{3}{11}$ of $2\frac{2}{11}$ P., take 4 A. 25 P. 12 sq. yd.

55. A man and his son walk from Hartford to New Haven, a distance of 36 miles; allowing that the man passes over a distance of 2 ft. 9 in. at each step, and the boy a distance of 1 ft. 10 in., how many more steps does the boy take than the man?

56. If a family of 9 persons consume $98\frac{1}{64}$ lb. of butter in $4\frac{1}{4}$ weeks, how many pounds will each person consume per week?

57. A father divided $3,000 among his 6 sons so that each elder brother had $100 more than his next younger brother. Required the share of the youngest.

58. If it is worth $.80 to saw a cord of wood consisting of sticks 4 feet long, into pieces $1\frac{1}{3}$ feet in length, how much is it worth to saw a cord consisting of sticks 8 feet long, into pieces of the same length?

59. J. Burke engaged to work a year for $180 and a suit of clothes; at the end of 8 months he was disabled, and received for his wages the suit of clothes and $110. What was the cost of the suit of clothes?

60. From the sum of $\frac{4}{5}$ lb., $4\frac{5}{6}$ oz., and $31\frac{1}{3}$ pwt. take the difference between $\frac{3}{5}$ oz. and $\frac{7}{8}$ pwt.

61. How far may a person ride in a coach which goes 10 miles an hour, so that he may be gone 3 hours, provided he walk back at the rate of 4 miles an hour?

62. There is a cask containing brandy and water; $\frac{3}{4}$ of the whole + 4 gallons is brandy, and $\frac{1}{5}$ of the whole + 2 gallons is water. How many gallons of each?

63.

Wm. Richards & Co. in ℅ current with Wood & Powers.

Dr. *Cr.*

1875					1875				
July	2	To 896 pounds butter, $.35			Nov.	3	By 61 bbl. apples. $3.50		
Aug.	17	" 872 " cheese, .18			"	24	" 56 " dr. " 3.87½		
"	24	" 481½ " lard, .14½			Dec.	1	" 70 " turnips, .40		
Oct.	4	" 509¾ " tallow, .15			"	22	" 31 drums figs, .87½		
"	18	" 81 dozen eggs, .26			1876				
"	31	" 15 barrels salt, 2.10							
Dec.	15	" 41 hams, 963⅜ lb., .16½			Jan.	2	" Note at 3 mo. to Bal.		

Wood & Powell.

Boston, Jan. 2, 1876.

What was the face of the note, to balance the acc't?

64. John, Henry, and Charles have respectively 65, 91, and 117 cents, with which they agreed to purchase tops at the highest price that will allow each one to spend all his money. How many tops can each buy?

65. A certain sum of money is divided among 4 persons. A has $\frac{1}{4}$; B, $\frac{1}{5}$; C, $\frac{1}{3}$; and D the remainder, which is $39. How much more has A than D?

66. If a horse eat $19\frac{3}{7}$ bushels of oats in $87\frac{3}{7}$ days, how many bushels would 14 horses eat in 30 days?

67. James Stow can mow a field in 6 days, by working 10 hours a day; his son George can mow the same field in 9 days, by working 8 hours a day. How long will it take them both to mow the field, provided they each work 6 hours a day?

68. A market-woman bought a number of peaches at the rate of 2 for 1 cent, and as many more at the rate of 3 for 2 cents, and sold them all at the rate of 5 for 3 cents, gaining 4 cents. How many peaches did she buy?

69. If 10 oxen, or 14 cows, eat $4\frac{5}{16}$ tons of hay in 58 days, in what time will 4 oxen and 6 cows eat the same quantity of hay? 70

70. A man took 5 loads of turnips to market, each load containing 16 bags, and each bag 3 bushels; he sold them for 20 cents a bushel, and received in payment 4 boxes of sugar, each box containing 8 papers, and each paper 15 lb. What was the price of the sugar per pound? 10

71. Sold 72 yd. carpeting at \$1.37½ a yd., and gained thereby \$18. How much did it cost me per yard?

72. A merchant carried on business three years; the first year he gained a sum equal to $\frac{4}{11}$ of his original capital; the second year he lost ¼ of what he had at the end of the first year; the third year he gained $\frac{3}{10}$ of what he had at the end of the second year; he then had \$14,625. How much had he gained in the three years?

73. A farmer exchanged 26 bu. 1 pk. 6 qt. of oats for 22 bu. 4 qt. of salt. What quantity of oats must be brought to the same market by a farmer who wishes to get 73 bu. 3 pk. of salt?

74. Divide 637 A. 128 P. 11 sq. yd. 4 sq. ft. 16 sq. in. by 16.

75. How many feet of boards will it require to inclose a building 60 ft. 6′ long, 40 ft. 3′ wide, 22 ft. high, and each side of the roof 24 ft. 2′, allowing 523 ft. 3′ for the gables, and making no deduction for doors and windows?

76. From a cellar 38 ft. 10′ long, and 9 ft. 4′ deep, were excavated 275 cu. yd. 5 cu. ft. 1′ 4″ of earth; how wide was the cellar?

77. What part of $\dfrac{12\frac{1}{2}}{\frac{4}{7}}$ is $\dfrac{\frac{2}{3}\text{ of }\frac{3}{4}}{\frac{1}{2}}$?

78. What is the ratio of $\dfrac{11\frac{3}{2}}{8\frac{7}{8}}$ to $\frac{5}{8}$ of $\frac{3}{10}$ of $\dfrac{9\frac{3}{4}}{13}$?

79. What will be the cost of a cask of molasses, at 40 cents a gallon, if $\frac{4}{5}$ of it be 42 gal. 2 qt. 1 pt.?

80. What length of time elapsed from 16 minutes past 10 o'clock, A.M., July 4, 1866, to 22 minutes before 8 o'clock, P.M., Dec. 12, 1871?

81. How many pickets, each 3 in. wide, placed 3 in. apart, will be required to fence in a lot 6 rd. by 14 rd., and what will be their cost at $2.75 per C.?

82. A pedestrian, in training for a foot-race, traveled 75 mi. 157 rd. 5 yd. 2 ft. 10 in. the first week; the second week, 89 mi. 129 rd. 2 yd. 1 ft. 10 in.; the third week, 127 mi. 249 rd. 1 yd. 3 ft. 10 in. How far did he travel in the three weeks?

Give the sum in units of lower denominations of—

83. $\frac{7}{10}$ wk. + $\frac{2}{5}$ da. + $\frac{3}{8}$ hr.; .3 lb. + $\frac{5}{9}$ oz. + $\frac{6}{7}$ oz.

84. $\frac{2}{3}$ yd. + $\frac{3}{4}$ ft. + $\frac{7}{8}$ mi.; .555£. + $\frac{10}{33}$£. + 1,856$\frac{3}{4}$d.

85. $\frac{5}{8}$ A. + $\frac{7}{13}$ A. + $\frac{3}{85}$ sq. mi.; 2,093.57 cts. + 75$\frac{3}{4}$ dimes + $\frac{9}{19}$ eagle; $\frac{7}{12}$ guinea + $\frac{17}{15}$ of $\frac{1}{2}$ crown.

86. $\frac{8}{15}$ T. + $\frac{17}{24}$ cwt. + .4815 lb.; $\frac{9}{19}$° + 27.35° + 260,234″.

87. .67 league + $\frac{5}{6}$ mi. + $\frac{9}{11}$ rd.; $\frac{3}{8}$ of 3$\frac{2}{3}$ A. + $\frac{5}{6}$ A.

88. A cellar 48 ft. 6 in. long, 24 ft. wide, and $6\frac{1}{2}$ ft. deep was excavated by 4 men in 12 da.; how many cubic yards of earth did each man throw out daily, and what was the entire cost at $.40 a cu. yd.?

89. If a person count 90 a minute for 10 hours each day, how long will it take him to count a million?

90. X and Y traded in company. X put in merchandise valued at $8,000, and Y put in $20,000 cash. They agreed to share the gains or losses equally. At the end of two years, the business proving unsuccessful, they dissolved partnership, and found the losses amounted to $11,500. What was each partner's share of the remaining property?

91. The forward wheels of a carriage are 10.5 feet in circumference, and the hind wheels 15 feet. The places where the tires are welded together in each wheel were up together when the carriage started, and when it stopped the same places were up together for the 352d time. Required the number of miles the carriage had traveled, allowing 5,280 feet to a mile?

92. A and B set out from the same place, and in the same direction; A traveled 16 miles a day, and after traveling $7\frac{1}{2}$ days turned and went back as far as B had traveled in $7\frac{1}{2}$ days: he then turned again, and pursuing his journey, overtook B 25 days after they had first set out. How far did B travel each day?

93. A grocer has $74\frac{13}{16}$ gallons of beer, which he wishes to put into bottles, each holding $\frac{7}{16}$ of a gallon. How many dozen bottles must he obtain?

94. A and B engage in trade. A furnished $\frac{7}{16}$ of the capital, and B $\frac{9}{16}$. If B should transfer $$379\frac{3}{7}$ of his capital to *A, their shares would be* equal. How much did each furnish?

95. A garrison of 5,000 men were besieged in a town, with provisions for three weeks, allowing each man 16 ounces per day. Being reinforced by 3,000 men, upon what allowance per day must the garrison be put, that the same provisions may last four weeks?

96. Divide $1,000 among 7 boys and 9 girls, giving to each girl $\frac{7}{9}$ as much as to each boy. How much does each boy and girl respectively receive?

97. A, B, and C can perform a certain piece of work in $26\frac{10}{19}$ days; A, B, and D in $29\frac{11}{17}$ days; A, C, and D in $33\frac{3}{5}$ days; and B, C, and D in 42 days. How long would it take each to do it alone?

98. The discharging pipe of a cistern has $\frac{3}{5}$ the capacity of the receiving-pipe, which will fill the cistern in 9.8 hours; the receiving-pipe has been open $4\frac{2}{3}$ hours, when the discharging-pipe is opened. In how many hours after will the cistern be full?

99. How many rails, of the longest possible equal length, will inclose a rectangular field 9,893 feet long by 8,047 feet wide, with a straight fence six rails high?

100. A tree 164 feet high, in falling was broken into two pieces, of such lengths that $\frac{3}{5}$ of one piece equaled $\frac{4}{7}$ of the other. Required the length of the pieces.

Find the value in lower denominations of—

101. $\frac{7}{24}$ wk.—$\frac{9}{16}$ hr.; .1934 S.—.217°.

102. 422,031 lb.—($\frac{3}{5}$ T.+$\frac{3}{7}$ cwt.); $\frac{2}{7}$ of $3\frac{3}{4}$ mi.+$17\frac{1}{7}$ rd. —$213\frac{1}{3}$ rd.

103. $\frac{7}{13}$ hhd.—.125 bbl.; Cong. $\frac{2}{5}$—f ℥ .7.

104. $\frac{4}{5}$ of $3\frac{3}{8}$ Cd.—$\frac{5}{16}$ Cd.; 42 A.—(120 sq. rd. × 56).

105. $\frac{5}{6}$ bale—$\frac{1}{3}$ of $\frac{5}{2}$ of 2 bundles; $\$\frac{7\frac{4}{11}}{1\frac{3}{11}}$—5,375 mills.

106. The value of all the exports at the port of St. Petersburgh in 1869, by maritime commerce, was 47,327,711 roubles; the value of the imports for the same year was 116,444,587 roubles. How much did the imports exceed the exports in value, a rouble being worth 80 cents?

107. The whole length of railroads in the United States Jan. 1, 1850, was 7,475 miles; 20 years later the number of miles open for traffic was 475 miles less than $6\frac{3}{5}$ times the number of miles in 1850; the estimated cost of the roads and equipments, at the last-mentioned period, was $2,000,000,000. What was the total number of miles of railroad open in 1870, and the average cost per mile?

108. The bronze used in the construction of the Vendome Column amounted to 251,367 kilogrammes, valued at 1,005,468 francs. What was the weight and value in United States standards?

109. If the circumference of the truck-wheels of an engine be $8.\dot{8}$ feet, and of the drivers $21.\dot{3}$ feet, how many more times will the one revolve than the other in running from New York to Albany, the distance being 150 miles?

110. The circumference of a circle is always 3.141592 times the diameter. How many revolutions will a carriage-wheel, which is $3\frac{1}{2}$ feet in diameter, make in going a distance of 5.73 miles?

111. A company in a fort numbering 75 men have provisions for 30 days. How many men must depart that the same may last the remainder 45 days?

112. How many yards of carpeting, $\frac{7}{8}$ yd. wide, will cover the floor of a room that is 18 ft. 6 in. long, and 16.4 ft. wide. What will be its cost at 2.37\frac{1}{2}$ a yard?

113. A boat which could move 14 miles an hour in still water, was accelerated $2\frac{1}{2}$ miles per hour in going down stream, and retarded the same in coming up; it was 10 hours longer in coming up a certain distance than in going down the same. What was the distance?

114. An agent rents 7 tenements at $1.50 a week; 5 at 1.87\frac{1}{2}$ a week; and 9 at 2\frac{3}{4}$ a week; what do the rents amount to in 1 year?

115. What will 250 mi. of telegraph-wire cost at 3 cts. a foot?

116. What will 46,560 lb. of wheat cost at $1.60 a bushel?

117. Change 6 lb. 10 oz. 15 pwt. Troy to Avoirdupois weight.

118. A cubic foot of water weighs 62 lb. 8 oz. What is the pressure on 1 sq. rd. at the bottom of the sea, where the water is 500 fathoms deep?

119. Bought a lot 25 rods long and 20 rods wide for $10,000, and sold the same at 25 cents per square foot. How much was my gain?

120. How much will 5 short tons of barley cost in California at $.96 a bushel?

121. Reduce to the simplest form—

$$\frac{\frac{2}{3}}{\frac{4}{5}} \times \frac{\dfrac{1}{7\frac{2}{3}}}{\dfrac{1}{.0\frac{8}{9}}} \times \frac{\dfrac{.00\frac{2}{3}}{7}}{\dfrac{.003\frac{1}{3}}{25}} \times \frac{207}{500}.$$

122. A cellar is 26 feet long, 18 feet wide, and 7 feet deep. How much earth must be removed to make it 28 feet long, 21 feet wide, and 8 feet deep?

123. How many square yards in the walls of a room 40 feet long, $31\frac{1}{2}$ feet wide, and 12 feet high?

124. I purchased some pens at two for a cent, and 1.5 times as many at 3 for 2 cents; I sold them all at the rate of one-half a cent each, and lost 15 cents by the transaction. How many of each kind did I buy?

125. The market value being the same in both States, a farmer from New Jersey exchanged 50 bushels of buckwheat, worth $\$1\frac{1}{3}$ a bushel, with a farmer in New York, for oats, worth $.40 a bushel, which he sold in his own State for cash. The exchange being made by weight, in whose favor was the difference, and how much in cash value?

126. What will $4\frac{3}{8}$ bales of cloth cost, each bale containing 43.75 yards, at $.75 a yard?

127. A man worked 3 months, 25 days each month, 10 hours each day, for $.08 an hour, and received in payment 2 loads of grain, each containing 15 bags of $2\frac{1}{2}$ bushels each. What was the price of the grain per bushel?

128. How much heavier is 2 lb. of feathers than 2 lb. of gold?

129. Divide Cong. 22 f ℥ 13 f ʒ 2 by 24.

130. I wish to put 111 bu. 2 pk. 4 qt. of grain into bags that shall contain 2 bu. 1 pk. 4 qt. each; how many bags will be required?

131. I bought 397 barrels of flour, at $9.625 per barrel; 290 bushels of corn, at $.93 per bushel; 48 barrels of beef, at $.09 per lb.; 170 barrels of pork, at $\$.08\frac{1}{2}$ per lb.; and 225 cords of wood, at $\$.87\frac{1}{2}$ per cord foot. What was the difference in value between the sum of the cost of the flour and the corn, and the sum of the cost of the other articles?

132. A 12mo book contains 384 pages; how many reams of paper will print an edition of 2,500 copies?

133. How many tons of hay, at $.75 per cwt., must be given for 35 cords of wood, at $.60 per cord foot?

134. It is estimated that the Falls of Niagara have receded 50 yards within the last 40 years. How long at this rate has it taken them to recede from Lewiston, 6 miles below their present site?

135. What part of 5 da. 23 h. 58 min. is 4 da. 6 h. 50 min.?

136. Bought 7,000 bushels of corn in Chicago at $.80 a bushel. I shipped the same to Buffalo, and sold it at an advance of 20 cents per bushel; the expenses for freight and handling the grain were $500: the corn being bought and sold by weight, how much did I gain or lose?

137. Nineteen lots of equal size contain 159 A. 97 sq. rd. 25 sq. yd. 8 sq. ft. 130 sq. in. What is the value of one lot, the land being worth half a dollar per square foot?

138. A spent $\frac{1}{6}$ his money and gave away $20; he then spent $\frac{1}{5}$ the remainder and gave away $10 less than $\frac{1}{4}$ of what then remained, and found he had $48 left. How much had he at first?

139. Thirty-two men agree to build 14 mi. 5 fur. 34 rd. 6 ft. of road; when the work is $\frac{1}{6}$ done, they employ 8 more men. What distance does each man construct?

140. A housebreaker having been brought before a judge, it was proved that he had stolen property to the value of £9 12s. 9d. 3 far.; he was sentenced to pay at the rate of £9 12s. 9d. 3 far. for every pound stolen. How much was the fine?

141. A and B started together by railroad from Memphis for New Orleans, the distance being 343 miles; A traveled by express, at the rate of 30 miles per hour; B by mail-train, at the rate of 25 miles per hour; C left New Orleans for Memphis at the same time, by fast line, at the rate of 32 miles per hour. How far from Memphis were A and B respectively when C passed them?

142. What is the value of .6923828125 cwt. of coffee at 38$\frac{2}{5}$ cents a pound?

Reduce—

143. 2,468d. to half-crowns; $88.35 to francs.

144. 150 U. S. bushels to Imp. bu.; 356 dr. Apoth. to Troy weight.

145. 4,000 bu. of corn Ill. to N. Y. standard; 130 Imp. gal. to wine gal.

146. 40$\frac{2}{7}$ wine gallons to beer gal.; 1,200 inches to chains.

147. £25 to dollars and cents; 20 Napoleons to U. S. money.

148. 4,527 grams to hectograms; 3.5 kiloliters to liters.

149. How much beef, at 7d. a pound, ought I to receive for 27 lb. 12 oz. of butter at 1s. 9d. per pound?

150. A ship at the equator in 20° 30′ W. longitude, sailed due West until its longitude was 36° 18′ W. How many statute miles did the ship sail?

151. A gentleman traveling west from Boston, which is 71° 3′ W. longitude, finds, on his arrival at St. Louis, that his watch is 1 hr. 17 m. 24 sec. faster than the time at the latter place; if his watch has kept accurate time, what is the longitude of St. Louis?

152. Bought 48 bushels of corn in New Jersey at $.90 a bushel, and sold the same at 2 cents per pound. How much was the whole gain?

153. What will be the cost of 9 gal. 3 qt. 1 pt. 2 gi. of kerosene oil at 42 cents per gal.?

154. Express in acres and the decimal of an acre the area of 49 square lots, each measuring 5 rd. 8 ft. 3 in. on a side.

155. A wood-dealer delivered a quantity of wood at a factory; it was in three piles—the first was 18 ft. 6 in. long, 7 ft. 6 in. high, and 4 ft. wide; the second was 16 ft. 9 in. long, 6 ft. 9 in. high, and 4 ft. 6 in. wide; the third was 20 ft. 3 in. long, 7 ft. 4 in. high, and 4 ft. 6 in. wide. How many cords were delivered?

156. A farmer sold 19 bushels of rye and 23 bushels of barley for $44.85; he received for the rye 15 cents more per bushel than for the barley. What was the price of each per bushel?

157. Sold 4 village lots; the first contained $\frac{1}{3}$ of $\frac{2}{5}$ of an acre; the second $40\frac{2}{3}$ rods; the third $\frac{1}{7}$ of an acre, and the fourth $\frac{3}{7}$ of $\frac{5}{8}$ of an acre. How much land in the four lots?

158. A man bought a horse and two carriages; for the first carriage he paid $250; if this sum were added to what he paid for the horse, it would amount to $\frac{2}{3}$ of the sum he paid for the second carriage; if the sum he paid for the horse were added to the sum paid for the second carriage, it would amount to three times the sum paid for the first carriage. What did he pay for each?

159. What is the value of a field 15 ch. 75 l. long, and 12 ch. 50 l. wide, at $64 per acre?

160. If a town 10 miles square be divided equally into 300 farms, what will be the size of each farm?

161. How much must be paid for a pile of wood 12¾ ft. long, 3¾ ft. wide, and 3½ ft. high, at $.64 per cord foot?

Reduce—

162. 36 cu. ft. 864 cu. in. hewn timber to the fraction of a ton.

163. f℥ 14 fʒ 5 ♏ 48, to the decimal of a Cong.

164. 12 sq. yd. 3 sq. ft. 54 sq. in. to the fraction of a square rod.

165. 3 fur. 6 rd. 4 yd. 2 ft. 6.24 in. to the decimal of a mile. 96

166. 86 P. to the fraction of 2 A.

167. 3 pk. 3$\frac{3}{7}$ qt. to the fraction of 1$\frac{3}{7}$ bu.

168. 62.5 lb. to the decimal of a cwt.

169. How many boards 12 ft. long will be required to enclose a field 48 rd. by 36 rd. with a fence 5 boards high?

170. How large an edition of an octavo book can be printed from 9 bales, 4 bundles, 1 ream of paper, allowing 20 sheets to the volume?

171. A man returning from the mines had 25 lb. 10 oz. of pure gold; what was its value at $1.04⅕ per pwt.?

172. Reduce $\frac{3}{7}$ of ⅔ of 45½ lb. to the decimal of a short ton.

173. There is a house 40 feet long, and each side of the roof is 20 feet wide; allowing each shingle to be 4 inches wide, and 18 inches long, and to lie one-third to the weather, how many half-thousand bunches will be required to cover the roof?

174. How many bushels of grain will a bin contain that *is 7.5 ft. long,* 6.25 ft. wide, and 3.75 ft. deep?

175. Suppose the Erie Canal to be 60 feet wide, and 6 feet deep, how many miles in length will it require to make one cubic mile of water?

176. The difference in longitude between London and St. Louis is 90° 20′; at a certain time each day it is as much past noon in London as it lacks of noon in St. Louis. What is the time in St. Louis?

177. At what time between 8 and 9 o'clock is the minute-hand as far beyond the V mark as the hour-hand is beyond the VIII mark?

178. A gentleman having $60, paid in Boston $8 for a hat, $6.75 for a vest, and $17.375 for a coat; going to New York, he paid $5.00 for his fare, and in the city bought 10 books at $1.31 each; gave $.90 to a blind man; and paid $5.50 hotel bill. How much money had he left?

179. On an acre of ground there were erected 21 buildings, occupying on an average 3 sq. rd. 112 sq. ft. 8 sq. in. How much of the acre remained unoccupied?

180. Colt's Armory, Hartford, Conn., which was destroyed by fire, February 4, 1864, was insured in New Haven to the amount of $20,000, which was $\frac{2}{3}$ the insurance in Providence, and $\frac{1}{2}$ the insurance in Springfield; the amount insured in these three cities was $\frac{3}{7}$ the insurance in Hartford; and the insurance in New York was $1\frac{1}{5}$ times all the others. How much was the total insurance?

181. A and B each observed an eclipse of the moon; A saw it commence at 9 hr. 10 min. P.M.; B at 9 hr. 15 min.; what was B's longitude relative to A's?

182. If 28 Cd. 1 cd. ft. of wood are put into 6 equal piles, each 20 ft. long and 5 ft. wide, how high must each be?

183. When the days are of equal length, and it is noon on the 1st meridian, on what meridian is it then sunrise? sunset? midnight?

184. St. Louis, Feb. 1, 1872.

T. M. Curtiss,

Bought of Bishop & Brothers,

450 lb.	A. Sugar	@	$ .12½
240 “	B. “	“	.11¾
320 “	Rice	“	.10½
220 “	O. J. Coffee	“	.22½
30 boxes	Oranges	“	3.75
16 “	Lemons	“	3.37½
15 “	Raisins	“	4.12½

What was the amount of the bill?

185. A person lived in Massachusetts until he was 18 years 8 mo. 24 da. old; in New York, ⅓ as long; in Pennsylvania ⅔ as long as in New York; and ½ as long in Tennessee as in Pennsylvania. What was his age?

186. If 14 casks of raisins, each weighing 125 lb., be carried 6 miles for $6.25, what will be the cost of carrying 56 casks, each weighing 100 lb., 66 miles?

187. What cost .01975 of a ton of steel at 20 cents per pound?

188. A vessel setting sail from Boston, proceeded in a south-easterly direction for 18 days; the captain then took an observation upon the sun, and found the local time at the ship's meridian to be 9 h. 53 min. 27.6 sec.; at the moment of the observation, his chronometer, which had been set for Boston time, showed 7 h. 17 m. 45 sec.; allowing that the chronometer had lost 2.52 seconds per day, *how much had* the ship changed its longitude?

189. A man paid $\frac{1}{3}$ of his debts, then $\frac{1}{2}$ of the remainder, when there was due $850. What was his indebtedness at first?

190. From $\frac{3}{7}$ of $365\frac{1}{4}$ da., and $\frac{3}{7}$ of $5\frac{4}{5}$ wk., take $\frac{3}{7}$ of $8\frac{2}{3}$ min.

191. A man having a field 30 rods square, sold 25 square rods to one of his neighbors, and 20 rods square to another. What is the value of the remainder at $175 per acre?

192. A father divides an estate worth $7777.88 between his two sons, giving the elder $\frac{1}{3}$ more than the younger. How much is each son's share?

193. A grocer bought 15 bbl. of dried cherries, each barrel containing 3 bushels, at $6 per barrel, and directed his clerk to retail them at 10 cents a quart. By mistake he used a beer measure. How much did the grocer lose by this mistake?

194. What part of a leap year is past at noon on the Fourth of July?

195. How many bales of cotton, of 400 lb. each, at 36 cents per lb., are equal in value to 18 hhd. of sugar, of 1,500 lb. each, at 8 cents per pound?

✓ *196.* There is a park 300 feet square; if a walk 4 feet wide be made around it, within the inclosure, how many square yards will it contain?

197. If a gallon of distilled water weigh 8 lb. 5.42 oz., what is the weight of 17 gal. 3 qt. 1 pt. 1 gi.?

198. If, when wheat is worth 6s. 3d. per bushel, a 5-cent loaf weighs 24 oz., and allows the baker $1\frac{1}{2}$ cents a loaf for his labor, what should it weigh when wheat is 8s. 4d. per bushel, to afford him the same profit on a loaf?

199. At 3½ cents per foot, what will be the cost of 12 planks, each measuring 56 ft. 9′?

200. There is a garden 6 rods long and 5 rods wide, with a ditch around it 5 ft. wide and 6½ ft. deep, the earth from which, was thrown upon the garden in uniform thickness. How much was the surface elevated?

201. Divide 100 into two such parts that one shall be 12½ greater than the other?

202. A man paid $46.50 for a pile of wood. Measuring it he found that it contained 5 Cd. 6 cd. ft. 12 cu. ft. What did the wood cost him per cord?

203. A room is 18 ft. 6 in. long, 14 ft. 6 in. wide, and 9 ft. 9 in. high; there are four windows in the room, each 6 ft. long by 3 ft. 3 in. wide, and two doors, each 6 ft. 9 in. high by 2 ft. 10 in. wide; the base is 9 in. wide. What will be the cost of plastering the room at $.15 per square yard?

204. An estate worth £3,680 is to be divided as follows: The widow has ⅓ of the whole, and the remainder is to be equally divided among 6 children. How much does each child receive?

205. The longitude of New Orleans is 89° 1′ 50″ W., and of St. Petersburgh 30° 19′ 46″ E. When it is 12 o'clock M. at New Orleans, what time is it at St. Petersburgh?

206. The distributing reservoir of Croton water is 425 feet square on the top, and 45 feet high. If the walls were perpendicular, what would be its capacity in wine gallons?

207. The difference of time at New York City and San Francisco being 3 hr. 13 min. 41 sec., and the longitude of the former 74° 1′, what is the longitude of the latter?

208. When the sun rises at San Francisco at 48 min. past 5 o'clock, what is the time in New York?

209. If 6 lb. of tea be worth 14 lb. of coffee, and 7 lb. of coffee be worth 24 lb. of sugar, how many pounds of tea can be bought for 16 lb. of sugar?

210. If a man could walk around the earth in 4 yr. 137 da. 15 h. 48 min., how long would it take him to walk one degree, allowing 365¼ days to a year?

211. A merchant owned $\frac{11}{16}$ of a stock of goods; $\frac{4}{5}$ of the whole stock were destroyed by fire, and $\frac{7}{12}$ of the remainder damaged by water. How much did the merchant lose, provided the uninjured goods were sold at cost, for $4,200, and the damaged at half the cost?

Change to units of lower denominations—

212. .92 da.; .67 league; .715°.

213. $\frac{5}{16}$ bu.; $\frac{5}{6}$ A.; .61 tun.

214. $\frac{17}{22}$ rd.; .3125 ream; $\frac{4}{7}$ great gross.

215. .3375 A.; $\frac{7}{9}$ of 5½ T.; $\frac{3}{7}$ S.

216. $\frac{7}{9}$ lb. Troy; $\frac{5}{16}$ Cd.; $\frac{5}{8}$ of 3 meters.

217. .525 of ½ A.; $\frac{5}{7}$ of 4 lb. Av.; $\frac{3}{8}$ of 2½ lb. Apoth.

218. $\frac{3}{4}$ of half a crown; $\frac{31}{40}$£; $\frac{7}{9}$ florin.

219. $\frac{3}{5}$ of $\frac{1}{10}$ of 3 long tons; .008 mi.; $\frac{7}{12}$ of $\frac{2}{3}$ of 5 mi.

220. .525£; .625 yr.; $\frac{5}{8}$ hhd.

221. A blacksmith bought 20 tons of iron at $80 per ton; he sold 6 T. 15 cwt. 84 lb., at $.05 per pound; having made 3,522 horse-shoes, averaging 2 lb. 8 oz. in weight, and sold them at $.25 each, he disposed of the remaining iron at $98 per ton. How much was his gain?

222. How much will it cost to carpet a room 21 ft. long, 15 ft. wide, with carpeting ¾ of a yard wide, at $1.62½ per yd.?

223. A person was commissioned to lay out equal sums in the purchase of spelling-books, grammars, algebras, and geometries, and to expend as little money as possible; he found spelling-books at \$.12½ each, grammars at \$.37½, algebras at \$.87½, and geometries of two styles of binding: one at \$1.10, the other at \$1.25, of which he imprudently chose the cheaper. How much money was thereby unnecessarily expended, and how many more books than was necessary did he purchase?

224. A goldsmith manufactured 1 lb. 10 oz. 15 pwt. of gold, which cost him \$16 per oz., into rings, each weighing 2 pwt. 12 gr., which he sold at \$3.12½ each. How much did he receive for his labor?

225. What decimal expression is equivalent to—

$$\frac{3\frac{1}{3}}{8} + .62\tfrac{1}{2} + \tfrac{1}{3} \text{ of } \frac{7\frac{2}{5}}{.05} \text{ of } 4 - 1.05\,?$$

226. Bought 12 T. 3 cwt. 70 lb. of sugar at \$8.25 per cwt. What was the cost?

227. My garden, which is 180 ft. long, and 150 ft. wide, is surrounded by a tight board-fence 5⅓ ft. high. How much will it cost to paint the fence on both sides at \$.12 per square yard?

228. Bought 37 T. 10 cwt. 90 lb. of copperas, at \$.04 per lb.; sold at one time 8 T. 12 cwt. 78 lb. at \$.05 per lb.; at another time 14 T. 3 cwt. 70 lb. at \$.06 per lb.; James Bond bought ¼ the remainder at \$.06 per lb.; and John Gaines ½ of what still remained at \$.10 per lb.: George Root, who bought the residue at \$.12 per lb., becoming a bankrupt, paid but 50 cents on a dollar of his debt. What was my whole gain?

229. A farmer has $16\frac{7}{8}$ bushels of corn, $33\frac{3}{4}$ bushels of rye, $35\frac{7}{16}$ bushels of wheat; he wishes to put the grain, without mixing, into the largest bags possible, of equal size. Required the number of bags, and the capacity of each.

230. A man bought 35 bushels of barley, and sold the whole for \$30. He made \$5.50 in the trade. What did he give per bushel?

231. A tailor has $67\frac{2}{5}$ yd. of cloth, from which he wishes to cut an equal number of coats, pants, and vests. What number of each can he cut, if they contain respectively $3\frac{7}{8}$, $2\frac{3}{4}$, $1\frac{4}{5}$ yards?

232. If 540 acres of land are divided between A and B in the proportion of 8 to 10, how many acres will each have?

233. Reduce £40 18s. 9.6d. to United States money.

234. Reduce \$99.88 to sterling money.

235. What number increased by $\frac{1}{3}$ of $\frac{3}{5}$ of itself $+ 420$, and the sum $\div 4 = 123$?

236. How many yards of carpeting $\frac{3}{4}$ yard wide are equal to 60 yards $1\frac{1}{4}$ yards wide?

237. How many yards of cloth, worth \$$3\frac{1}{4}$ a yard, will be equal in value to 24 sacks of coffee, each weighing 104 lb., at $37\frac{1}{2}$ cents per pound?

238. If I pay \$648 for 2 casks of Catawba wine, each containing 72 gal., and sell the same at the rate of \$$1\frac{7}{8}$ per quart, how much is my whole gain?

239. How many bricks, 8 in. long, 4 in. wide, and $2\frac{1}{2}$ in. thick, are required to build the front of a house whose wall is 30 ft. long, 24 ft. high, and 2 ft. thick, allowing the doors and windows to occupy $\frac{1}{4}$ the surface?

240. A merchant purchased in Liverpool 34 bales of cloth for £8 19s. 5d. per bale; he disposed of the cloth at cost, receiving 212 cwt. of sugar, at £1 5s. per cwt., and the balance in cash. How much in U. S. money was due him?

241. A company of 36 persons purchased a tract of land containing 2,766 A. 132 P.; J. Jenks, who was one of the company, and owned an equal share with the others, sold $\frac{2}{3}$ of his part for 1s. 9d. 2 far. per sq. rd. What sum did he receive?

242. How many silver dollars, each weighing $412\frac{1}{2}$ grains, could be made from the silver taken at the doors of the great London exhibition, the weight of the silver being 35 English tons?

243. What is the value of a pile of wood that is 10 rods long, 4 feet wide, and $1\frac{1}{2}$ yards high, at $5.75 per cord?

244. If a person spend in 6 months what he earns in $4\frac{1}{2}$ months, how many dollars can he lay by in a year, supposing he earns $325 in $2\frac{1}{2}$ months?

245. A man has two kinds of flour; the first is worth $2.50 per barrel more than the second, and 9 barrels of the second are worth as much as 7 of the first. What is the price of each kind per barrel?

246. My farm consists of 8 fields, containing $4\frac{3}{4}$, $5\frac{3}{5}$, $10\frac{5}{16}$, 9, $22\frac{7}{8}$, $17\frac{19}{20}$, $15\frac{33}{40}$, and $12\frac{39}{80}$ acres, respectively. How many acres in my farm?

Change—

247. $\frac{1}{300}$ lb. Troy to the fraction of a pwt.; $\frac{1}{2112}$ mi. to the fraction of a yd.

248. $\frac{1}{4}$ P. to the fraction of an A.; $\frac{1}{18}$ cu. yd. to the *fraction of a cu. ft.*

249. $\frac{2}{3}''$ to the fraction of a °.; $\frac{2}{5}$ pt. to the fraction of a bushel.

250. $\frac{4}{5}$ lb. to the fraction of a T.; $\frac{4}{9}$ of 20 sec. to the fraction of an hour.

251. $\frac{6}{7}$ of $\frac{4}{11}$ rd. to the fraction of a yd.; $\frac{1}{45}$ rd. to the fraction of a link.

252. What part of $365\frac{1}{4}$ days are 349 da. 8 hr. 52 m. $10\frac{10}{23}$ sec.?

253. The Connecticut River, which is 60 rd. 10 ft. wide at a certain place, has an average depth of 10 ft., and runs at the rate of $3\frac{3}{4}$ miles per hour. In what time will it discharge a cubic mile of water?

254. If a man's property is worth $1,500, and he owes $1,800, how many cents can he pay on the dollar?

255. If a man can pay his creditors only 48 cents on a dollar, how much can he pay on a debt of $52.50?

256. A farmer wishes to build a bin 8 ft. long, 6 ft. wide, and high enough to hold 200 bushels of corn. How high must he build it?

257. A boy having been sent to market to buy a certain number of pounds of meat, found that if he bought beef at $10\frac{3}{4}$ cents a pound, he would have $6\frac{1}{2}$ cents remaining; but if he bought pork, at $13\frac{2}{3}$ cents a pound, he would lack 46 cents of having money enough to pay for it. How much money had he? and how many pounds was he directed to buy?

258. What are the prime factors of 1,400?

259. How many integral divisors has 1,400?

260. How many bushels of coal will a boat 90 ft. long, 42 ft. wide, and $5\frac{1}{2}$ ft. deep contain, a bushel of coal being $1\frac{3}{4}$ cu. feet?

261. When $207 are paid for $10\frac{7}{20}$ months' labor, what wages shall be paid for $17\frac{7}{10}$ months' work?

262. A person having $\frac{7}{8}$ of a hogshead of wine, sold at one time $\frac{4}{5}$ of a gallon, at another $\frac{5}{6}$ of a quart. How many gallons, expressed decimally, did he sell, and how much remained?

263. How many seconds has a person lived who is 32 yr. 197 da. old, allowing for 8 leap years?

264. Paid 3 debts successively, each of which took $\frac{1}{2}$ the money I had before paying it, and $.75 more; after which I had $25 remaining. How much had I at first?

265. The length, width, and height of a room are respectively 36 ft., 24 ft., and 20 ft.; how many yards of painting are there in the walls, allowing for a fire-place 6 ft. by $5\frac{1}{2}$ ft., and for 2 windows, each $7\frac{1}{2}$ ft. by $3\frac{3}{4}$ ft.?

266. What would be the expense of paper for a room 75 ft. 9 in. long, 14 ft. 6 in. wide, and 10 ft. 3 in. high, which contains 3 windows, each 6 ft. 2 in. long, 3 ft. 10 in. wide, and 2 doors, each 6 ft. 10 in. by 3 ft., a roll of paper being 8 yd. in length, and $\frac{5}{8}$ yd. in width, and costing $$.62\frac{1}{2}$?

267. What are the contents of a field $38\frac{7}{50}$ rods in length and $37\frac{1}{2}$ rods in width?

268. Bought a barrel of flour for $11.50; 4 bu. corn, at $$1.12\frac{1}{2}$; 26.25 lb. sugar, at $$.12\frac{1}{2}$; 6 gal. molasses, at $$.62\frac{1}{2}$; 3 lb. tea, at $1.25; 9 lb. coffee, at $$.33\frac{1}{3}$; $12\frac{1}{2}$ lb. rice at $$.12\frac{1}{2}$; and 8 lb. butter, at $.28. What did the whole cost?

269. If a train of cars move with an average velocity of 32 mi. 220 rd. in 1 hr. 20 min., how far will it move in *3 hr. 36 min.?*

270. How many bricks are required to build the front of a house 50 ft. 8 in. in length, 15 ft. 8 in. in height, and 1 ft. 6 in. in thickness, the dimensions of a brick being 8, 4, and 2 inches?

271. The largest bell in the world is that of Moscow, which weighs 192 tons 17 cwt. 16 lb.; the great bell of St. Paul's weighs 5 tons 2 cwt. 47 lb. How many bells of the latter weight could be made from the former?

272. Sold 125 equal loads of wood, measuring 115 Cd. 3 cd. ft. 7 cu. ft. for $492.50. What is the quantity per load, and price per cord?

273. Bought 14 lots of land, each containing 37 P. 200 sq. ft.; from this purchase I sold 2 A. 65 P. 60 sq. ft., and the remainder I disposed of at 2s. 3½d. per sq. ft. How much did I receive for the last sale?

274. What is the value of 719,630 pounds of wheat at $1.80 per bushel?

275. If I buy 120 gallons of rum for $75, how much water must be added to it that I may sell it at 60 cents per gallon, and gain $15 in the sale of it?

276. A farmer, having harvested his crops, finds that he has corn enough to fill the first of the following boxes; wheat enough to fill the second, and rye enough to fill the third. The outer dimensions of the boxes are as follows: of the first, 10⅓ ft. long, 6½ ft. wide, and 6 ft. high; of the second, 9⅔ ft. long, 7⅓ ft. wide, and 5½ ft. high; of the third, 12 ft. long, 10 ft. wide, and 7 ft. high; they are made of plank 2 in. thick. He sells the corn at $.75 a bushel, the wheat at $1.12½, the rye at $.95. How many bushels of 2,150.5 cu. in. had he of each kind of grain, and how much money did the whole bring him?

277. How many half-dimes would it take to pay for 18 doz. of eggs, at $.30 per doz.?

278. A man has a field 37$\frac{4}{5}$ rods wide. What length must he cut off from the end to set off 5 A. 145 P.?

279. If the factors of a certain number are 16$\frac{1}{8}$, 30$\frac{2}{7}$, and 9$\frac{9}{10}$, what is $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{6}$ of the number?

280. What will it cost to construct 8 mi. 256 rd. of plank-road at $1,325.65 per mile?

281. What part of a short ton is $\frac{5}{7}$ of a long ton?

282. How much copper and tin in the great bell of Moscow, which weighs 192 tons 17 cwt. 16 lb., bell-metal consisting of 3 parts copper to 1 of tin?

283. The average distance of the planet Neptune from the earth is 2,864,000,000 miles; should it be blotted out, how long thereafter would its light be visible from the earth, the velocity of light being 192,000 miles per second?

284. How many francs must a merchant in Paris send to New York in payment for a debt of $15,989.862?

285. I have a field 96 rods long and 50 rods wide. How much would it cost to build a fence around it, at $.12$\frac{1}{2}$ per foot?

286. Reduce $.\dot{1}\dot{8}$, $.\dot{3}6\dot{9}$, $.\dot{3}0769\dot{2}$ and $\dot{6}.7\dot{5}$ to equivalent common fractions.

287. Exchanged 5 firkins of butter, of 50 lb. each, at $$\frac{5}{13}$ per pound, for 50 bags of guano, of 116$\frac{2}{3}$ lb. each. What was the price of the guano per short ton?

288. What weight of water in a cistern 10 ft. 6 in. square, and 8 ft. 4 in. deep, a cubic foot of water weighing 1,000 ounces?

Reduce—

289. 33 gal. 3 qt. 1 pt. 1$\frac{7}{13}$ gi. to the fraction of a hhd.

290. 12,150 geographic miles to the fraction of a great circle.

291. 4 da. 16 hr. 30 min. to the fraction of 3 weeks.

292. $26\frac{2}{3}$ tons of round timber to cords.

293. 4 oz. 19 pwt. to the fraction of 5 lb.

294. 2 oz. 16 pwt. 19.2 gr. to the decimal of 4 oz.

295. 9.75 tons hewn timber to feet board measure.

296. 165 ft. to the decimal of a mile.

297. $2\frac{3}{4}$ times 2 A. 124 P. to the fraction of 15 A. 42 P.

298. If a man fill $\frac{1}{3}$ of a cask with brandy, $\frac{1}{4}$ with wine, and $\frac{1}{5}$ with water, and it lack $21\frac{2}{3}$ gallons of being full, how many gallons will that cask contain?

299. A man, having $\frac{11}{18}$ of 5 tons of iron, sold $\frac{3}{7}$ of 9 cwt. What was the value of the remainder at $12\frac{3}{5}$ cents per pound?

300. Light moves 192,000 miles per second; sound, 1,142 feet per second; and a cannon-ball, with an average velocity of 800 feet per second. If a ball is discharged from a cannon 6 miles distant from a person, how long after the flash is seen will the sound reach his ear, and how long after the sound will the ball arrive?

301. A merchant bought 18 hogsheads of sugar, each containing .725 of a long ton, at the rate of $170 per ton, and sold the same at 10 cents per pound. How much was his gain?

302. On $\frac{2}{3}$ of my field I raise tobacco; on $\frac{1}{3}$ of the remainder I sow oats; potatoes are planted on $\frac{4}{7}$ of what still remains, and carrots on $\frac{4}{9}$ of the residue; I have left two small pieces, one of which is 4 rods square, and the other contains 4 square rods. How large is my field?

303. A grocer has coffee at \$.37½ per pound cash, but in trading with a farmer he charges \$.42. What must the farmer charge him for potatoes that he sells at \$.62½ cash?

304. There were sold in New York, in one week, 4,678 beeves, 156 cows, 367 veals, 12,281 sheep and lambs, and 6,297 swine. The average price of the beeves was \$80 per head; the cows, \$44.25; the veals, \$12.50; the sheep and lambs, \$7.50; and swine, \$18.25. What was the whole number of animals sold, and for how much?

305. The average fall of rain at Worcester, Mass., is 48.92 in.; of snow, 53.5 in.; allowing 5 in. of snow to make one of rain, how many hogsheads of water fall annually upon a flat roof 40 ft. long by 30 wide?

306. What number multiplied by 3⅙ times itself will produce 114?

307. Bought 425.75 lbs. wool at \$.75 per lb., which was manufactured into cloth at an expense of \$75.50. For how much must it be sold to gain \$48.25?

308. How many feet of boards will be required to make 8 boxes, whose interior dimensions are 6 ft. 5 in., 5 ft. 7 in., and 3 ft. 6 in. respectively, the boards being 1½ in. in thickness?

309. From 10 years subtract 9 yr. 9 mo. 9 wk. 9 da. 9 h. 9 min. 9 sec.

310. A merchant bought 15 barrels of salt, of 4 bushels each, at \$1⅖ a barrel, and retailed it at ⅔ of a cent a pint. How much was his whole gain?

311. If by selling cloth at 10s. 6d., ⅓ of the price is gain, what part of the cost would be gained by selling it at 13 shillings?

312. Bought 7.88125 A. of land at $\frac{1}{25}$ of $\frac{5}{8}$ of $\frac{8}{10}$ of 10 times $2.50 per square rod. How many dollars did it cost?

313. A ship's chronometer, set at Greenwich, points to 5 h. 45 min. 24 sec. P.M., when the sun is on the meridian. What is the ship's longitude?

314. The salary of the President of the United States is $50,000 per annum. How much can he spend each week, and yet save $27,200 in one term of office?

315. Required the quotients of 1,169 divided by its two prime factors next larger than 1.

316. A farmer bought some oxen, cows, and sheep, for $1,860, paying $45, $25, and $4 per head, respectively. There were 5 times as many cows as oxen, and 7 times as many sheep as cows. How many of each did he purchase?

317. A owns $\frac{5}{13}$ of a field, and B the remainder; $\frac{3}{4}$ of the difference between their shares is 5 A. 3 R. 16$\frac{1}{2}$ P. What is B's share?

318. A wine merchant wished twice as many quart bottles as pint; twice as many pint as half-pint, and twice as many half-pint as gill bottles, filled from a cask of wine containing 58 gal. 1 qt. 1 pt. 2 gi. How many bottles of each kind could he fill?

319. Peter Jones was born Sept. 7, 1841; he was 27 yr. 3 mo. 23 da. old when married; and 3 yr. 21 da. after marriage his first child was born. What was the date of his marriage? and what his child's birth-day?

320. Two boys purchased a pair of skates in company; one paid $\$\frac{7}{8}$, and the other $\$1\frac{5}{16}$; they sold them so as to gain $\$\frac{7}{16}$. What did they sell them for? and how much was each one's share of the gain?

321. How much more is the cost of 39 A. 95 P. of land at $87.375 per acre, than the expense of making 5 mi. 264 rd. of road at $587.75 per mile?

322. At what time between 11 and 12 o'clock is the minute-hand as far beyond the XI as the hour-hand lacks of being up to the XII mark?

323. A man started from Portland, Maine, with $100; he paid $3.25 for his fare to Boston; in that city he bought a book for $1.375, paid $3 hotel bill, and $1.50 for amusement; he then took passage in a steamer for Charleston, S. C., paying $32; in that city he purchased 8 yards of cloth at $2.62½ per yard, and paid $5.50 for having the cloth made up; he then went to Philadelphia, at an expense of $20, and there he purchased some pictures for $3.30, some presents for $4.80, and spent $2.50 at a hotel; the Camden and Amboy Railroad Company agreed to carry him to New York for the rest of his money; the regular fare being $3.00, how much did the company lose?

324. At $1,000 per acre, what is the value of a strip of land 44 yards long and 20 feet wide?

Reduce—

325. $.3\frac{3}{4}$ ft. to the decimal of a fath.; .45 pk. to the fraction of $1\frac{1}{4}$ bu.

326. .264 ft. to the decimal of a mi.; 22.4 gi. to the decimal of a gal.

327. .5 millimetre to the decimal of a metre; .025 gal. to the decimal of a pt.

328. 2 qt. 1 pt. 2 gi. to the fraction of 4 gal. 3 qt.

329. $\frac{2}{7}$ of $\frac{1}{2}$ of $22\frac{3}{4}$ lb. to the decimal of a short ton.

330. $\frac{3}{1360}$ of $4\frac{1}{2}$ times $\frac{2}{19}$ A. to the fraction of a sq. rod.

331. If 1 cubic foot of water weigh .625 cwt., what will be the weight of water in a cistern containing 500 cu. ft. 864 cu. in.?

332. William Shakspeare was born April 23, 1564. How many years since?

333. By selling wheat at 12s. 6d. per bushel, I gain £30 on the quantity purchased; but if I sell it for 13s. 6d. a bushel, I shall gain £42 on the same quantity. How many bushels were bought?

334. I had $\frac{1}{3}$ of a yard of broadcloth, for which I paid at the rate of \$$8\frac{1}{2}$ per yard; I gave the broadcloth and 50 cents for $1\frac{1}{4}$ yards of cassimere. What did the cassimere cost me per yard?

335. A liquor agent has 50 gallons of wine of a superior quality, worth \$7.50 a gallon; he wishes to reduce its quality by the addition of water, so that he may sell it at \$5.25 a gallon. How much water must he add?

336. What are the values of a bushel of peas, sold at 10 cents a quart, by wine and dry measure, respectively?

337. If a man can paint 4 sq. yd. in one hour, and is 31 h. 6 min. 40 sec. in painting two sides of a wall 7 feet high, how long is the wall?

338. The earth moves through $59.14'$ daily; how far did it move during the month of February, 1872?

339. A housewife exchanged old silver for a feather-bed worth \$24; the feathers were valued at \$.80 a pound, and the silver at 25 times the value of its own weight of feathers. What was the Troy weight of the silver?

340. What is the cost of a great gross of pens, at $6\frac{1}{4}$ cents for $\frac{3}{4}$ of a dozen?

341. A man and a boy start from the same place at the same time, and travel in the same direction; the man advances as far in three steps as the boy in five, but the boy takes 4 steps while the man takes 3; after a certain time they are $\frac{1}{2}$ mile apart. Allowing the man's steps to be 3 feet in length, how far has each traveled?

342. A person desirous of giving 1s. 6d. apiece to some needy boys, found that he had not money enough in his pocket by 5d.; he therefore gave them each 1s. 4d., and had 9d. left. Required the number of boys.

343. What part of 12 yd. 1 ft. 6 in. is $\frac{1}{2112}$ of a mile?

344. Four men receive $27.27 for hauling coal; the first hauled 2 T. 3 cwt. 93 lb.; the second 5 T. 16 cwt. 7 lb.; the third, 4 T. 18 cwt. 50 lb.; the fourth, 14 cwt. 20 lb. How must the money be divided?

345. What is the difference in weight between 8 lb. of gold and 8 lb. of lead?

346. A speculator purchased 10,000 bushels of corn in Chicago, at $.625 per bushel, and sold one-half of it in New Jersey at $.84 per bushel, and the other half in New York at $.87 per bushel; the freight was $.10 a bushel, and other charges amounted to $230. The corn being bought and sold by weight, how much did he gain?

347. A bowlder, containing $\frac{2}{3}$ of $\frac{6}{9}$ of $23\frac{4}{7}$ cu. ft., is what fraction of a perch?

348. A boy having been sent to the store with $5\frac{1}{2}$ doz. of eggs, was directed to purchase with them equal quantities of sugar, coffee, butter, and tea; he disposed of his eggs at the rate of 2 for 5 cents, and paid for the articles purchased 17, 28, $37\frac{1}{2}$, and $137\frac{1}{2}$ cents per pound respectively. What amount of each did he purchase?

349. A grocer bought 10 bushels of beans at $3 per bushel, and ordered his shop boy to retail them at 15 cents a quart. By mistake the boy used a liquid quart. How much more was the grocer's gain than he expected?

350. What part of a cord of wood is a load 7⅕ ft. long, 2⅓ ft. high, 3⅓ ft. wide?

351. A person bought a watch, chain, and pencil, for £30; the chain cost twice as much as the pencil, and the watch twice as much as the chain and pencil. What did he give for each?

352. If I exchange 4 bu. 1½ pk. of potatoes for 2 bu. 2 pk. of apples; how many bushels of apples ought I to receive in exchange for 33 bu. 1 pk. of potatoes at the same rate?

353. A man chopping wood at $.75 per cord, earned $35.25 during the working days of January, 1871, and was idle 2½ days. How much wood did he cut, on an average, per day?

354. If $\frac{3}{13}$ of an acre produce 28 bushels of potatoes, how many bushels will 4 acres produce, at the same rate?

355. A room is 57 ft. long by 32 ft. wide. How many people can be seated in it on chairs which are 1½ ft. wide, and placed 2 ft. apart from back to back, allowance being made for a clear passage 4 feet wide down the middle of the room, and for a clear space 12 ft. deep at the end?

356. How thick is a cubic inch of gold, beaten so as to cover a space 83 ft. 4 in. long and 23 ft. 5 in. wide?

357. At $3.87½ per square, what will be the expense of flooring a house in which there are 4 rooms, 14 ft. 6 in. by 15 ft. 3 in.; 6 rooms 9 ft. 9 in. by 11 ft. 4 in., and 3 rooms 12 ft. 3 in. by 8 ft. 2 in.?

358. What is the value of Cong. $\frac{42}{96}$?

359. Bought 1,500 bushels of oats in Iowa, at $.40 a bushel. For how much per bushel must I sell them in Connecticut, so that, after paying $75 expenses, I shall neither gain nor lose by the transaction, the buying and selling being by weight ?

360. A reservoir for water is 100 ft. long, 64 ft. wide, and 10 ft. deep. The bottom and sides are lined with plank which cost $2\frac{1}{2}$ cents per square foot. Had the reservoir been a cube of equal capacity, how much would have been saved in the cost of the plank for lining it ?

361. A gentleman bought 95 yards of cloth, $\frac{3}{4}$ of a yard wide, for $100, and gave the same and $25 for cloth of the same quality, 1 yard wide. How many yards did he buy ?

362. If a vessel sail 80 leagues in a day, how many statute miles does she sail ?

363. If at each stroke of the piston-rod of a locomotive-engine a distance of 15.625 feet be passed over, how many strokes must be made in passing from New York to Washington, the distance being 225.25 miles.

364. If 9 horses eat $\frac{3}{4}$ of $7\frac{1}{5}$ bushels of oats in a day, how much does each horse eat ?

365. Seven men engage to do a piece of work in a given time, but three of them failing to come, the work was prolonged $7\frac{1}{2}$ days. In what time would the seven men have done it ?

366. The third satellite of Jupiter is .0000885 of the mass of the planet, and .02947 of the mass of the earth. The mass of Jupiter is how many times that of the earth ?

367. Two men, 84.675 miles apart, traveled till they met each other, when they found that one had traveled 8.425 miles farther than the other. How far did each travel?

368. Six boys divided some chestnuts among themselves; James took $\frac{1}{3}$ of them wanting 6; Thomas took 6 less than $\frac{1}{3}$ of the remainder; John took 5 less than $\frac{1}{2}$ of what still remained; Henry took 2 less than $\frac{1}{4}$ of what then remained; William took 5 less than $\frac{3}{5}$ of the residue, and George took the remainder, which was 25. How many chestnuts were divided?

369. A steamer, going from New York to Hamburg, traversed $10\frac{1}{2}$ degrees of longitude daily. What length of time was it from one noon to the next?

370. There is an island 27 miles in circumference; A, B, and C start from the same point, and travel in the same direction around it; A goes at the rate of 4 miles; B, 7 miles, and C, 10 miles per hour. In what time will they all be together?

371. A clothier has 920 soldiers' coats to make, each coat containing $2\frac{1}{4}$ yd. of cloth $1\frac{5}{8}$ yd. wide, and lined with drilling $\frac{3}{4}$ yd. wide. How many yards of lining will be required?

372. Reduce $\frac{31}{35}$ of a long ton to the decimal of a short ton.

373. Two persons traveling in the same direction, the first at the rate of $9\frac{3}{4}$ miles per hour, the second $14\frac{1}{2}$ miles, pass the same mile-stone at an interval of 5 hours. How long and how far must the second travel, after passing the mile-stone, to overtake the first?

374. What is the value in statute miles of $\frac{7}{16}$ of a Great Circle of the earth?

375. The exterior semi-diameter of the exterior ring of Saturn is 88,209 miles, and of the interior ring 75,845 miles; the width of the interval between the rings is 1,791 miles, and the space between the planet and interior ring is 19,089 miles. What is the width of the rings, the semi-diameter of the planet being 39,580 miles?

376. A certain number is divided by 9, and the quotient multiplied by 17; the product is then divided by 300, and 33 is added to the quotient; the result is next divided by 3, and from this quotient 31 is subtracted, and the resulting difference divided by $12\frac{1}{2}$. Now $\frac{1}{2}$ of $\frac{3}{5}$ of $\frac{4}{7}$ of this last quotient is $2\frac{2}{35}$. Required the original number.

377. How many feet of boards will it require to inclose a barn 40 ft. 6 in. long, 30 ft. 10 in. wide, 18 ft. 4 in. high, and each side of the roof 16 ft., allowing 385 ft. 3 in. for the gables?

378. The number of railroad accidents in the United States in 1862 was $\frac{3}{8}$ of the number of persons killed by the accidents; and the injured, which were 877, were 30 more than $2\frac{1}{3}$ times the number of accidents and killed together. What was the number of accidents, and how many were killed?

379. A farmer exchanged 11 loads of potatoes, each load containing 12 barrels of $2\frac{1}{2}$ bushels each, at $.50 per bushel, for a number of pieces of cloth, each containing 12 yards, worth $2.75 per yard. How many pieces did he receive?

380. What is the value of Cong. .05751953125?

381. How many more bushels will a cubical box contain, whose sides measure 8 ft., than one that is 10 ft. long, 8 ft. wide, and 6 ft. deep?

382. A degree of longitude, in the latitude of Boston, measures 44½ geographic miles. How many more statute miles in 10° of longitude at the equator than in the latitude of Boston?

383. How many seconds in 40 tropical years, 340 da. 22 h. 37 min. 45 sec.?

384. A surveyor, measuring a piece of land in the form of a rectangle, found one side to be 55 ch. 50 l., and the other 63 ch. 24 l. How many acres did it contain?

385. A speculator in New York bought 1,000 bushels of grain at $1.10 per bushel, and shipped the same to England, paying $125 transportation; he sold the grain at $1.40 per Imperial bushel. What was his gain?

386. If the diameter of the sun be 884,000 miles, and that of the earth 8,000 miles, how many bodies of the size of the earth, placed in a line, would reach across the sun's diameter?

387. Reduce 6 leagues, 2 mi. 137 rd. 4 ft. 1½ in. to statute miles.

388. A tract of land measuring 4,059 A. 96 P. was divided among a regiment of men, consisting of one colonel, 1 major, 6 captains, 8 lieutenants, 24 sergeants, and 220 privates, so that a private had one share, a sergeant twice as much, a lieutenant 6 shares, a captain 8, the major 14, and the colonel 20 shares. Required the share of each?

389. From the sum of $\frac{2}{5}$ lb. $2\frac{5}{12}$ oz. $15\frac{2}{3}$ pwt., take the difference between $\frac{4}{5}$ oz. and $\frac{2}{3}$ pwt.

390. A farmer sold 8 loads of potatoes, averaging 27 bu. 3 pk. 5 qt. each, for $.45 a bushel. How much did he receive?

391. In traveling, when I arrived at Louisville, my watch, which was exactly right at the beginning of my journey, and a correct time-keeper, was 1 h. 6 min. 52 sec. fast; from what direction had I come, and how far?

392. A canal contractor engaged to excavate 2 miles of canal across a plane, at 8 cents per cubic yard; the canal to be 54 feet wide at top, 40 feet at bottom, and $4\frac{1}{2}$ feet deep; what did it amount to?

393. What must be given for 3 bu. 1 pk. 3 qt. of clover-seed, at $4.48 per bu.?

394. A gallon of distilled water weighs 8 lb. 5.42125 oz.; required the weight of 5 gal. 3 qt. 1 pt. 3 gi.

395. Divide $897.43 among A, B, and C, so that B may have $93.40 less than A, and $69.18 more than C.

396. A person dying, left in cash $6,250, and 4 houses, valued at $3,456.785 each; his indebtedness was $2,261.60, and he left directions that $100 should be expended for a monument; the residue was to be divided among his 4 sons, so that each should receive $\frac{3}{4}$ as much as his next older brother. Required the share of each.

397. What is the least number which, being divided by 3, 5, 7, 9, and 10, leaves a remainder of one?

398. What part of a hogshead of wine is 3 gal. 1 qt. $2\frac{2}{19}$ gills?

399. There is a house 45 feet long, and each of the two sides of the roof is 22 feet wide. Allowing each shingle to be 4 inches wide and 15 inches long, and to lie one-third to the weather, how many half-thousand bunches will be required to cover the roof?

400. A cistern measures 4 ft. 6 in. square, and 6 ft. deep; how many hogsheads of water will it hold?

401. A block of granite containing 126 ft. 10′ 11″, is 2 ft. 6′ wide, and 3 ft. 7′ thick; what is its length?

402. If a young man, by early rising, can save 2½ hours each day for study and improvement, how many years of study can be gained in 25 years, allowing 365 days in a year, and 12 hours in a day?

403. If it require 859⅜ reams of paper to print 12,000 copies of an 8vo book containing 550 pages, how many reams will be required to print 3,000 copies of a 12mo book containing 320 pages?

404. How many inches higher is a horse that measures 16½ hands than one that stands 14¾ hands high?

405. The longitude of Springfield, Mass., is 72° 35′ 45″ W., and of Galveston, Texas, 94° 46′ 34″ W.; when it is 20 min. past 6 o'clock A.M. at Springfield, what time is it at Galveston?

406. Two numbers are to each other as 5 to 7½, and the less is 164.5; what is the greater?

407. How many bushels, Indiana standard, in 36,244 lb. of wheat?

408. A fruit-grower put 178 bu. 1 pk. 6 qt. 1 pt. of cherries into casks, each containing 2 bu. 3 pk. 6 qt., and sold them for $315.90. How much did he receive per cask?

409. If a grocer use scales that weigh 15¼ oz. for a pound, how much does he defraud in selling $55.04 worth of sugar?

410. Three men cut 15½ cords of wood in 2¾ days, for which they received $11.62½. What were the average daily wages of each man?

411. How many wine gallons will a tank hold that is 4 ft. long by 3¾ ft. wide, and 1⅔ ft. deep?

412. What will be the cost of 300 bushels of oats in Michigan at $1\frac{1}{4}$ cents per pound?

413. What will be the cost in Missouri?

414. What will be the cost in Connecticut?

415. What will be the cost in Kentucky?

416. What will be the cost in Maine?

417. How much cloth, at $4.00 per yd., must be given for 9 tons, 8 cwt. $87\frac{1}{2}$ lb. of sugar, at $9.50 per cwt.?

418. If $22\frac{4}{9}$ cords of wood last as long as $15\frac{7}{13}$ tons of coal, how many cords of wood will last as long as $11\frac{9}{26}$ tons of coal?

419. If a piece of gold is $\frac{5}{8}$ pure, how many carats fine is it?

420. What is the value of a farm 189.5 rd. long and 150 rd. wide, at $$31\frac{3}{4}$ per acre?

421. Reduce 9.75 tons of hewn timber to feet, board measure, that is, 1 inch thick.

422. If 1000 men, besieged in a town with provisions for 5 weeks, allowing each man 16 oz. per day, be reinforced with 500 men more—and supposing that they cannot be relieved until the end of 8 weeks—how many ounces a day can each man have, that the provisions may last them that time?

423. A person proposes to sell his horse by lottery; if the price of the tickets be $3 each, he will lose $20 on his horse, but if he sell them at $4 each he will gain $20. What was the value of the horse and the number of tickets?

424. A hound ran 200 rods before he caught a fox; $\frac{3}{7}$ the distance the fox ran before being caught was equal to the distance he was in advance when they started. How far in advance was the fox, and how far did he run?

425. What cost 4 bundles, 1 ream, 6 quires, 12 sheets of paper at $45.72 per bundle?

426. The longitude of Constantinople is 28° 49′ east, and of St. Paul 93° 5′ west; when it is 3 o'clock P.M. at the latter place, what time is it at the former?

427. What time is it at St. Paul when it is midnight at Constantinople?

428. A meteorological observer, in Cayuga County, New York, registered the total fall of rain, in 1861, of 34.86 in.; of snow, 40.495 in.; and 3.5 in. of snow made one inch of water. How many hogsheads of water fell, during the year, in the town of Genoa, which is 10 miles square?

429. A ship captain, sailing from London to New York, found, on taking an observation, that the sun at noon was 3 h. 25 min. 40 sec. later than the London time, as shown by his chronometer. How many degrees west had he sailed?

430. In 1855 the U. S. Government sold 15,729,524 acres of public lands, for $11,246,609.66. How much did John Smith pay for a quarter section, at the average price per acre?

431. There are two rooms, each requiring 36 sq. yds. of carpeting, and their sides are 10 feet high. One room is square, and the other $2\frac{1}{4}$ times as long as it is broad; how many square yards of paper are required to line the side walls of each, allowing 10 sq. yds. for doors and windows, and 4 sq. yds. for waste in fitting the paper to each room?

432. What is the value in currency—gold 1.10—of £25 4s.?

433. The longitude of Cambridge, Eng., is 5′ 2″ E., and of Mobile, Ala., 88° 1′ 29″ W.; when it is 12 o'clock M. at Mobile, what is the time at Cambridge?

434. If an army of 5,000 men have provisions for 15 days, at the rate of 20 oz. a day to each man, and they be reinforced with 3,000 men, upon what daily allowance must each man be put that the same provision may last 20 days?

435. What is the value, at $5 per cord, of a pile of wood 200 ft. long, 30 ft. wide, and 5 ft. 4 in. high?

436. A cubic foot of distilled water weighs 1,000 ounces avoirdupois; what is the weight of a wine gallon?

437. Subtract $\frac{7\frac{1}{2}}{8\frac{1}{3}}$ bu. + $\frac{5}{8}$ of $\frac{46}{75}$ of $3\frac{1}{3}$ qt. from 5 bu. $3\frac{31}{45}$ qt.

438. What is the difference between $\frac{7}{8}$ of 5 sq. mi. 250 A. 120 P., and $3\frac{1}{4}$ times 456 A. 134 P. 25 sq. yd.?

439. How many pounds of silver, Troy weight, are equivalent in value to 5.6 lb. of gold by the English government standard?

440. A floor whose length is 48 ft. 6′ has an area of 1,176 ft. 1′ 6″; what is its width?

441. A merchant in selling groceries sells $14\frac{9}{16}$ oz. for a pound; how much does he cheat a customer who buys of him to the amount of $38.40?

442. B and C have each a farm; B's farm is worth $32.50 an acre, and C's $28.75; but in trading B values his at $40 an acre. What value should C put upon his?

443. How many planks $10\frac{2}{3}$ ft. long and $1\frac{1}{2}$ in. thick, are equivalent to 3,000 planks 12 ft. 8 in. long and $2\frac{3}{4}$ in. thick?

444. Gunpowder, made according to the Government receipt, is a compound of $\frac{3}{4}$ nitre, and equal parts of sulphur and charcoal. How much of each in 1 ton of powder?

445. If it cost $95.60 to carpet a room 24 ft. by 18 ft., how much will it cost to carpet a room 38 ft. by 22 ft. with the same material?

446. If $16\frac{7}{18}$ cords of wood last as long as $11\frac{9}{26}$ tons of coal, how many cords of wood will last as long as $15\frac{7}{13}$ tons of coal?

447. Three horses start from the same point, and at the same time, upon a race-course 300 rods in circuit; the first horse passing over $\frac{1}{2}$ the circuit, the second $\frac{2}{5}$, the third $\frac{1}{3}$, in a minute. In how many minutes will they all be together again, and how far will each have traveled?

448. How many cubic quarter inches in a slab of marble 2 yd. long, 1 ft. 6 in. wide, 3 in. thick?

449. If the longitude of Boston is 70° 4′ West, what will be the time in that place when it is 3 h. 35 min. A.M. in London?

450. Albert Tucker, owning 80 acres of land, cultivated $1\frac{1}{2}$ acres potatoes, $3\frac{3}{4}$ corn, $2\frac{1}{4}$ rye, $1\frac{3}{4}$ oats, $\frac{1}{2}$ carrots, $\frac{1}{4}$ turnips, from which he harvested 160 bushels potatoes, $48\frac{2}{3}$ corn, 28 rye, $56\frac{1}{2}$ oats, 650 carrots, and 720 turnips per acre, respectively. He cut $1\frac{3}{4}$ tons hay on each of $12\frac{3}{4}$ acres, and upon the remainder he pastured 30 sheep, 5 cows, 2 horses, and 8 steers, for 24 weeks. He sold his potatoes, corn, rye, oats, carrots, and turnips, at $.75, $1.12½, $1.25, $.40, $.25, and $.15 per bushel, respectively; he sold his hay at $16 per ton, and received 3, 20, 45, and 15 cents each week, respectively, for pasturing the sheep, cows, horses, and steers. What were the net profits of the farm, supposing he paid $25 taxes, and $30, $28, $16, $16, $40, $32, and $5 per acre, respectively, for cultivating and harvesting the potatoes, corn, rye, oats, carrots, turnips, and hay?

CHAPTER V.

THE examples of this chapter will include, in combination with the subjects of the preceding chapters, the subject of Percentage, in all its varied and practical applications.

MENTAL EXERCISES.

1. How many hundredths of a number is 3 per cent. of it? 12 per cent.? 15 per cent.? 25 per cent.?

2. How many hundredths of a number is $5\frac{1}{2}$ per cent. of it? $6\frac{1}{4}$ per cent.? $8\frac{3}{4}$ per cent.? $\frac{1}{2}$ of 1 per cent.? $\frac{4}{5}$ of 1 per cent.?

3. What per cent. of a number is .07 of it? .08? .15? .125? $.33\frac{1}{3}$? $.00\frac{4}{5}$?

4. What per cent. of a number is $\frac{75}{100}$ of it? $\frac{105}{100}$? $\frac{118}{100}$?

5. What per cent. of a number is 1.25 of it? $1.33\frac{1}{3}$? 1.455?

6. How many hundredths of a number is 55 per cent. of it? 94 per cent.? 115 per cent.? 175 per cent.? 220 per cent.?

7. What fractional part of a number is 5% of it? 10%? $12\frac{1}{2}$%? 20%? $33\frac{1}{3}$%? 50%? 75%?

8. What decimal part of a number is $\frac{1}{2}$% of it? $\frac{1}{5}$%? $\frac{3}{4}$%? $\frac{4}{5}$%? $\frac{3}{8}$%? $\frac{7}{10}$%? $\frac{9}{20}$%?

9. What is 5% of \$40? 6% of 50? 8% of \$120?

10. What is 10% of 120 miles? $12\frac{1}{2}\%$ of 160 gal.? 25% of \$300?

11. What is 8% of 36 yards? $33\frac{1}{3}\%$ of 150 bu.? 50% of 175 lb.?

12. What is $2\frac{1}{2}\%$ of 80 yd. of cloth? $4\frac{1}{8}\%$ of 96 gal. of wine?

13. What is $\frac{4}{5}\%$ of 140 bbl. flour? $1\frac{3}{4}\%$ of \$400?

14. What is $\frac{1}{8}\%$ of 1,600 men? $\frac{1}{3}$ of 1% of 90 trees? $\frac{1}{2}$ of $\frac{4}{5}$ of 1% of 250 miles?

15. If I have \$600 in bank and draw out $16\frac{2}{3}\%$, how much remains?

16. If a man spend \$$1\frac{5}{6}$ a month for tobacco, in what time will he spend \$$16\frac{1}{2}$ at the same rate?

17. Bought $\frac{1}{3}$ of $6\frac{3}{5}$ cords of wood for $\frac{1}{4}$ of \$$52\frac{4}{5}$; what did 1 cord cost?

18. A grocer bought 10 baskets of eggs, containing 20 dozens each, but found, on unpacking them, 8% broken; how many dozens remained?

19. If a man spend $\frac{4}{5}$ of his salary, what per cent. of it does he save?

20. A man having 160 sheep, sold all but 20% of them; what part did he sell, and what per cent. did he save?

21. What is 25% of $\frac{3}{4}$? $12\frac{1}{2}$ of $\frac{8}{9}$? 6% of $2\frac{1}{2}$? $4\frac{1}{2}\%$ of $6\frac{2}{3}$?

22. What per cent. of 36 is 9? 12? 18? 24? 27?

23. What per cent. of \$60 is \$3? \$5? \$10? \$12? \$15? \$20? \$30? \$40? \$45?

24. What per cent. of 48 miles is 6 miles? 8 miles? 12 miles?

25. From a hogshead of wine 42 gallons were drawn; what per cent. of the whole remained?

26. A quantity of produce was sold for $80, at a sacrifice of $\frac{3}{7}$ of the cost; what was the loss on it?

27. $1\frac{1}{2}$ is what per cent. of 12? of 15? of 21?

28. $3\frac{1}{4}$ is what per cent. of $9\frac{3}{4}$? of 13? $16\frac{1}{4}$? 26?

29. $\frac{7}{8}$ is what per cent. of $1\frac{3}{4}$? $3\frac{1}{2}$? $4\frac{3}{8}$? 7?

30. What part of $4\frac{1}{2}$ acres is $\frac{1}{3}$ of $3\frac{1}{4}$ acres?

31. If to $\frac{3}{4}$ the cost of A's coat you add $15, the sum will be $51; what was the cost of the coat?

32. A man pays $6 an acre for the use of land valued at $75 an acre; what % of the value of the land does he pay?

33. 2 bu. 1 pk. is what % of 11 bu. 1 pk?

34. 15 gal. 3 qt. is what % of 2 bbl.?

35. $\frac{4}{5}$ of an hour is what % of $\frac{2}{3}$ of a day?

36. A boy having $62\frac{1}{2}$ cents, gave $37\frac{1}{2}$ cents for a ball; what % of his money had he left?

37. Two men bought 36 bushels of apples; one paid $7, the other $5; how many bushels should each have?

38. A farmer having 200 barrels of potatoes, sold $\frac{1}{4}$ of them to one man and $\frac{1}{3}$ of the remainder to another; what % remained unsold?

39. $40 is 8% of what sum of money?

40. 25 is $12\frac{1}{2}$% of what number? 20% of what number?

41. 8.4 pounds are 7% of how many pounds?

42. I loaned a man a sum of money; at one time he paid me $80, which was 16% of the whole sum I loaned him; how much did I loan him?

43. If $\frac{1}{2}$ a barrel of flour cost $$5\frac{5}{8}$, what will $\frac{2}{3}$ of a barrel cost?

44. A man owning 30% of a mill sold $33\frac{1}{3}$% of his share for $1,500; what was the value of the mill?

45. A dairyman having a number of cows bought 24 more, which purchase was 40% of the whole number he had; how many cows had he before he bought the last lot?

46. A clerk stole $\frac{4}{5}$ of all the money in the cash drawer; when arrested he had spent $\frac{3}{4}$ of what he had taken and had $10 left; how much was in the drawer at first?

47. $250 is 25% more than what number?

48. 321 miles is 7% more than how many miles?

49. 92 is 8% less than what number?

50. 255 feet are 15% less than how many feet?

51. Sold my horse for $264, which was 12% less than what I paid for him; how much was my loss?

52. A man is 64 years old; $12\frac{1}{2}$% of his age is $33\frac{1}{3}$% of the age of his oldest son; how old is his son?

53. A farm cost $3,000; $\frac{2}{3}$ of this sum was $\frac{5}{8}$ of 4 times the cost of the barn that was on it; what was the cost of the barn?

54. An auctioneer sold goods to the amount of $400; what does his commission amount to at $2\frac{1}{2}$%?

55. Paid a broker $\frac{3}{4}$% for selling $800 worth of railroad stock; how much did he receive?

56. A merchant in Chicago sends 4,000 bushels of wheat to his correspondent in Boston, who sells it for $1.50 per bushel, and retains $2\frac{1}{2}$% commission; how much money should he send the merchant?

57. A man failing in business can pay but 40% of his debts; how much will a creditor receive on a debt of $225?

58. A collector received $60 for collecting bills at 4% commission; how much money did he collect?

59. A broker in St. Paul exchanged $1,600 on the Park Bank of New York at $\frac{3}{8}$%; how much brokerage did he receive?

60. A real estate agent sells my house and lot for $4,000, and charges me a commission of 1$\frac{1}{2}$%; how much does he receive?

61. A gentleman divided $100 among his 2 sons and 3 daughters, giving each son $\frac{1}{2}$ as much as each daughter; how much did each receive?

62. What amount of accounts must an individual collect in order to pay over $900 and retain 6$\frac{1}{4}$% for collecting?

63. What must be paid for insuring a case of cloths valued at $500, at 1$\frac{2}{5}$% premium?

64. What is the annual premium of insurance at $\frac{3}{4}$% on a building valued at $6,000?

65. At 4$\frac{1}{2}$%, what amount of insurance can be obtained for $90 on a car-load of stock?

66. Three men hired a pasture for $50; one put in 25 sheep, another 35 sheep, and another 10 cows, one cow being equal to 4 sheep. What should each pay?

67. When stock is at 5% premium, what is the market-value of $1? of $100? $200?

68. When stock is at 10% discount, what is the market-value of $1? of $100? $200?

69. Paid $120 premium, at 1$\frac{1}{5}$%, for insuring a boat-load of wheat; what was the amount insured?

70. How much will 10 shares ($100 each) of bridge-stock cost at 5% premium? at 5% discount?

71. How is stock quoted in market when it is 12% premium? when it is 12% discount?

72. When stock is quoted at 112½%, what is the value of $1? of $100?

73. When stock is quoted at 75%, what is the value of $1? of $100?

74. How much will 5 shares of bank-stock cost, when quoted at 102? at 96? at 120?

75. If an insurance company declare a dividend of 4%, how much will a stockholder receive who owns 20 shares? 30 shares? 50 shares?

76. How many yards of carpeting, ⅔ of a yard wide, are equal to 18 yards, ¾ of a yard wide?

77. A ferry company make an assessment of 3½% for repairs; how much must a stockholder pay who owns 12 shares? 15 shares? 20 shares?

78. If 3 men earn $⅞ in ¼ of a day, in how many days will 5 men earn $11⅔?

79. When railroad-stock is quoted at 85, how many shares can be bought for $425? $1,700?

80. A man paid $1,750 for stock in an iron-foundry, at 12½% discount; how many shares did he buy?

81. Bought a harness for $84, and sold it at an advance of 12½%; how much was it sold for?

82. Paid $12 for 15 bushels of oats; what must they be sold for a bushel to gain 25%?

83. How much bank-stock can be bought for $920, when quoted at 115? at 92? at 184?

84. A broker received $715 for 11 shares of mining-stock; what was the market-value per share?

85. A man bought 60 barrels of apples for $180, and sold them at a loss of 20% on the cost; how much did he receive per barrel for them?

86. If gold is at a premium of 15%, how much currency must a man pay for $50 in gold?

87. How much gold can a man buy for $2,400 in bills, when gold is at a premium of 20%?

88. If he sells the same at a premium of 28%, how much is his gain? if at 18%, how much will he lose?

89. If I buy butter at 28 cents a pound, how must I sell it to gain 40%?

90. Bought a village lot for $200, and sold it an advance of 225%; how much was my gain?

91. How much per cent. is gained by selling flour at $10 per barrel that cost $8?

92. If a pole 10 feet long cast a shadow 8 feet, how long is a pole that casts a shadow 18 feet?

93. Sold damaged flour so as to lose $\frac{1}{8}$ of what it cost; what per cent. was lost?

94. Bought a carriage for 20% less than $150, and sold it for 10% more than $150; what was the gain per cent.?

95. What % is lost in buying potatoes at 50 cents a bushel, and selling them at 40 cents?

96. A man divided a piece of land among his 3 sons; to the first he gave $14\frac{1}{2}$ acres, to the second $\frac{2}{5}$ of the whole, and to the third as much as to the other two; how many acres had each, and how many acres in the whole piece?

97. A grocer bought eggs for 15 cents a dozen, and sold them for 20 cents; what % did he gain?

98. A street-vender bought oranges at 18 cents a dozen, and sold them at 2 cents apiece; what was the gain per cent.?

99. What is the annual interest of $150, at 6%?

100. What is the annual interest of $200, at 7%?

101. What is the yearly interest of \$400, at $12\frac{1}{2}\%$?

102. What is the yearly interest of \$75, at $6\frac{1}{4}\%$?

103. What is the per cent. of gain when an article is sold for $\frac{2}{3}$ of what it cost? $\frac{4}{3}$? $\frac{6}{5}$? $\frac{11}{8}$?

104. What is the loss per cent. when an article is sold for $\frac{4}{5}$ of its cost? $\frac{3}{4}$? $\frac{2}{3}$? $\frac{7}{8}$? $\frac{9}{10}$? $\frac{11}{12}$?

105. Bought lemons at the rate of 6 for 15 cents, and sold them at the rate of 10 for 30 cents; what was the gain per cent.?

What is the interest of—

106. \$40.20 for 1 year, at $8\frac{1}{4}\%$? \$70 for 2 years, at 7%?

107. \$50 for 2 years, at 5%? \$84 for 3 years, at $5\frac{1}{2}\%$?

108. \$150 for 5 years, at 8%? \$200 for 4 years, at $6\frac{1}{4}\%$?

109. Gave a note for \$65.40, due in 3 years, at 8%; what was the interest? what the amount?

110. A man pays \$600 rent, and $\frac{3}{4}$ of this is just $\frac{1}{3}$ of $\frac{1}{2}$ of twice his annual income; what is his annual income?

111. If the market-price of goods is 90% advance on the cost, what per cent. advance on the cost would remain after making a discount of 10%? $12\frac{1}{2}\%$? 20%? 10% and 5%? 10%, $7\frac{1}{2}\%$, and 5%?

112. A bookseller buys books at $\frac{1}{4}$ off that retail at \$1: what per cent. does he make?

113. If an article sells for 100% less than cost, what part of the cost does it sell for?

114. Sold flour at \$12 a barrel that I bought at $\frac{1}{8}$ off from the same price; what % did I make?

115. What will \$150 amount to in 6 months, 20 days, at 7%?

116. Sold a bill of goods at wholesale at 40% off, and 5% off for cash; what was the total discount?

117. Which is the better, and how much, to buy goods at 25%, and 5% off for cash; or to buy at 5%, and 25% off for cash?

118. A grocer bought tea that he could sell for \$.90 a pound and make $33\frac{1}{3}$% profit; how much did it cost him?

What is the interest of—

119. \$120 for 2 years 6 months, at 7%?

120. \$65.50 for 3 years 4 months, at 8%?

121. \$200 for 1 year 10 months, at 6%?

122. \$300 for 9 months, at 9%?

123. \$500 for 4 months, at $6\frac{1}{4}$%?

124. \$220 for 1 year 3 months, at 7%?

125. A sells a horse to B, and gains $12\frac{1}{2}$%; B sells him to C for \$236, and makes a profit of 18%; how much did the horse cost A?

126. If a person loaning money receives for its use a sum equal to $\frac{1}{10}$ of it, what per cent. does he receive?

127. Sold a village lot for \$230, which was 8% less than cost; had it been sold for \$300, what would have been the gain per cent.?

128. A speculator sold barley at \$.90 a bushel, losing 10%; at what price should he have sold it to gain 15%?

129. A manufacturer sold 2 reapers for \$150 each; on one he gained 15%, on the other he lost 15%; what was his gain or loss on both?

130. Sold a house and lot for $\frac{3}{4}$ of $1\frac{3}{5}$ times its cost; what was the gain per cent.?

131. What is the amount due on a note of \$500, on interest 1 year 4 months, at 6%?

What is the interest of—

132. \$40 for 1 year 7 months 15 days, at 6%?

133. $120 for 2 years 1 month 6 days, at 12½%?

134. $300 for 4 years 4 months 24 days, at 5%?

135. $288 for 8 months 10 days, at 7½%?

136. $30.60 for 11 months 20 days, at 15%?

137. $1,200 for 2 months 24 days, at 6%?

138. What principal in 1 year, at 6%, will give $24 interest? $33? $48? $54?

139. What principal in 2 months 15 days, at 7%, will give $16.62½? $66.50?

140. What principal in 10 years, at 7%, will amount to $340?

141. What principal, at 4%, in 18 months, will amount to $530?

142. Two men bought 200 acres of land, and at the end of 2 years sold it for $1,500, which was an advance of 12½% per annum on its cost; what did it cost an acre?

143. In what time will $300 gain $84, at 7%?

144. In what time will $88 gain $15¾, at 6¼%?

145. In what time will $140 gain $19.60, at 8%?

146. In what time will any principal double itself at 5%?

147. In what time will $200 double itself at 6%? 7%? 8%?

148. In what time will $500 double itself at 3%? 10%? 12½%?

149. In what time will $100 treble itself at 6%? 7%? 8%?

150. A man received $27 for the use of $90, at the end of 6 years; what was the rate per cent.?

151. If $400 gain $55 interest in 2½ years, what is the %?

152. Gave $45 for the use of $180 3 years 9 months. what was the rate per cent.?

153. Paid $500 a year rent for a farm, which was $6\frac{1}{4}\%$ on the purchase-money, at $40 an acre; how many acres in the farm?

154. In how many years will a man paying 7% interest on the cost of his house, pay the amount of the debt in interest?

155. A, B, and C built a yacht for $800; B paid $100 more than A, and C paid as much as the other two; how much did each pay, and what part of the whole did each own?

156. $\frac{4}{3}$ of 36 is $\frac{4}{9}$ of how many times $\frac{2}{7}$ of 42?

157. $\frac{4}{3}$ of 36 is $\frac{4}{9}$ of 9 times $\frac{2}{7}$ of what number?

158. $\frac{4}{3}$ of 36 is $\frac{4}{9}$ of 9 times how many sevenths of 42?

159. $\frac{4}{3}$ of 36 is $\frac{4}{9}$ of 9 times 2 times what part of 42?

160. $\frac{4}{3}$ of 36 is how many ninths of 9 times $\frac{2}{7}$ of 42?

161. $\frac{4}{3}$ of 36 is 4 times what part of 9 times $\frac{2}{7}$ of 42?

162. $\frac{4}{9}$ of 9 times $\frac{2}{7}$ of 42 is $\frac{4}{3}$ of what number?

163. $\frac{4}{9}$ of 9 times $\frac{2}{7}$ of 42 is how many thirds of 36?

164. $\frac{4}{9}$ of 9 times $\frac{2}{7}$ of 42 is 4 times what part of 36?

165. B traveled 102 miles in 3 days; the first day he traveled $\frac{1}{2}$ as far as on the last 2 days, and the last day $\frac{1}{2}$ as far as on the first 2 days; how far did he travel each day?

166. A market-woman bought 30 oranges at the rate of 2 for a cent, and as many lemons at the rate of 3 for a cent, and sold the whole at the rate of 5 for 2 cents; did she gain or lose, and at what rate per cent.?

167. C, D, and E, talking of their ages, D said that his age was one and a half times the age of C; C said his age was one and a fourth times the age of both C and D; and that the sum of their ages was 90 years; what was the age of each?

WRITTEN EXAMPLES.

1. What part of a number is 8⅓%? 12½%? 20%? 18¾%? 16⅔%? 31¼%?

2. What part of a quantity is 37½%? 66⅔%? 56¼%? 68¾%? 83⅓%? 93¾%?

3. What is 23⅓% of 45 miles? 15⅝% of 576 pounds? 56¼% of 228 gallons? 1000% of $10.48¾?

4. What per cent. of 46 gal. is 5 gal. 3 qt.? of £320 10s. is £25 12.8s.?

5. If 4½ bushels of potatoes are worth $1.50, how much are 27.25 bushels worth?

6. My salary is $800 a year. I pay 35% of it for board, 11% for clothing, 12% for books, and 7% for incidentals. How much are my yearly expenses?

7. If 13½ bushels of wheat make 3 barrels of flour, how many bushels of wheat will be required to make 40 barrels of flour?

8. A farmer raised 20% more of wool this year than last; the amount raised during the two years was 1,320 lbs. What amount of wool was raised each year?

9. In a hogshead of alcohol the water is 6½% of the spirit; how many gallons of each?

10. 2,365 is 8% of 30% of 225% less than what number?

11. 3,018 is 6% of 12½% of 80% more than what number?

12. 78 A. 78 P. is 104% of what number?

13. From a stack of hay a farmer sold 9 T. 12 cwt. 25 lb., which was 78⅛% of the whole; how much remained?

14. Gold 18 carats is how many % purer than gold 14 carats fine? how many % pure is each?

15. The U. S. dry gallon contains 268.8 cu. in., and the liquid gallon 231 cu. in.; how many % larger is the dry than the liquid gallon?

16. Reduce 4 mi. 98 rd. 1 ft. 10 in. to the fraction of 15 mi. 23 rd. 2 yd. 5 in.

17. Reduce 2 qr. 24 lb. $8\frac{3}{4}$ oz. to the fraction of 3 cwt. 2 qr. 26 lb. 13 oz. 8 dr. the long ton.

18. A horse which cost me $135 I sold for $150, on 9 months' credit. How much did I gain, money being worth 6%?

19. A merchant-tailor bought 4 pieces of cloth, each containing 30.9375 yd., at $2.00 per yard; he sold $\frac{1}{3}$ of it at $2.20 per yard, and made up the remainder into suits, each containing $7\frac{1}{2}$ yd., which he sold for $18.50 each. How much did he gain?

20. I purchased 6,000 bushels of wheat in Chicago at $\$1.37\frac{1}{2}$, and shipped the same to my agent in Albany, who sold it at $\$1.62\frac{1}{2}$. How much did I make, after paying $543 for expenses and a commission of $2\frac{2}{5}\%$?

21. Reduce $\dfrac{\frac{3}{4}\text{ of }4\frac{2}{7}}{5\frac{1}{7}-\frac{1}{14}}$ of 4s. $5\frac{1}{4}$d. to the fraction of $\frac{5}{9}$ of £2 6s. $8\frac{1}{4}$d.

22. What length of carpet, $\frac{3}{4}$ yd. wide, will cover the floor of a room 13 ft. 4 in. long, and 12 ft. 9 in. wide?

23. The amount of money deposited in the savings banks of New York, in 1863, was $54,557,500; the amount withdrawn from the same during the year was $11,347,960. What per cent. of the amount deposited was withdrawn, and how much was the annual interest at 5% on the money remaining?

24. If 24 men, in 9 days of 12 hours each, build a wall 200 feet long, 6 feet high, and 2 feet thick, how many men, in 72 days of 10 hours each, can build a wall 950 feet long, 8 feet high, and 5 feet thick?

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25. A man sleeps $7\frac{1}{2}$ hours each day. What per cent. of his time does he sleep?

26. A and B enter into partnership for three years; A contributes £500, at the end of the first year he adds another £500, and at the end of the second year £450; B contributes £800, at the end of the first year and a half he adds £500, and six months before the partnership concludes he withdraws £350. Eight months after the commencement of the partnership C is admitted with £1,000, which he leaves in till the end; how should a profit of £4,013 11s. be divided among the partners?

27. A man drew 30% of his bank deposits, and expended 25% of the money thus drawn to purchase a horse worth $97.50. How much money had he in bank?

28. A grocer bought 2 T. $14\frac{1}{2}$ cwt. of cheese at $240 per ton, and retailed the same at 16 cents per pound. What per cent. was his profit?

29. The capital of an insurance company is $250,000; its receipts for one year are $58,760; its losses and expenses are $40,010. What rate of dividend can it declare?

30. If 360 bushels of oats will last 12 horses 15 days, how long will 636 bushels last 18 horses?

31. The U. S. liquid gallon contains 231 cu. in.; how many % smaller is it than the dry gallon? how many % larger is the dry than the liquid gallon?

32. From a pile of wood 10 C. 4 cd. ft. 12 cu. ft. was taken, which was 40% of the whole pile; how much was left?

33. How many % larger than the U. S. liquid gallon is the Imperial gallon of Great Britain which contains 277.274 cu. in.?

34. If 144 pounds Avoirdupois be equivalent to 175 pounds Troy, what would be the weight expressed in pounds Troy of 3 cwt. 3 qr. 12 lb., allowing 28 pounds to the quarter?

35. If a man, by laboring 12 hours each day, can perform a piece of work in 3 weeks, by laboring 6 days in a week, how long would it take him to do the same if he labor 10 hours each day?

36. Bought 4 hhd. of sugar, each containing 1,825 lbs., at $6\frac{1}{4}$ cents per pound, and paid $31.975 for freight, storage, and cartage. Allowing 5% for leakage and waste, for how much per pound must I sell the remainder to gain 25%?

37. Bought a house for $4,500, and paid $500 cash; the balance is to be paid in 8 equal annual installments. What is the mean time for paying the balance?

38. A carriage, traveling at the rate of $8\frac{1}{2}$ miles an hour, accomplishes $\frac{2}{5}$ of a journey in 3 hr. 20 min.; in what time will it perform $\frac{4}{7}$ of the same journey at the rate of $9\frac{1}{4}$ miles an hour?

39. I remit to my agent at Chicago $84650, to purchase flour. After deducting his commission of $1\frac{1}{2}$%, and $23.36 for other expenses, how many barrels of flour, at $8 a barrel, will the money purchase?

40. Divide $460 into 3 parts, which shall be to each other as $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$?

41. Sold $\frac{4}{5}$ of a hhd. of molasses for what the whole cost me; what was my gain per cent.?

42. The expenses of a school for one year were $2,000 for salary of teachers, $105.50 for fuel, $56.25 for incidentals; the public money was $750.75, and the remainder was paid by a rate bill. If the aggregate attendance was 35,275 days, how much must John Spencer pay, who sent 3 pupils 175 days each?

43. Sold a horse at 33⅓% gain, and with the money bought another horse, which I sold for $120, and lost 25%. Did I gain or lose by my trading? and how much?

44. A railroad jobber contracted to build 20 mi. 225 rd. of railroad for $25,000 per mile; after finishing the work, he found the actual cost was $75 per rod. How much did he clear by the job, and what was the rate of his profit?

45. A man wishing to sell a horse, asked 25% more than it cost; he finally sold it for 15% less than his asking price, and gained $7.50. How much did the horse cost him, and what was his asking price?

46. When does the amount of the following bill become due, per average

George Barbour,

To J. B. Hale & Co., *Dr.*

1872.

Jan.	20	To	100	yd.	Broadcloth	@	$3.25
"	25	"	2,500	"	Sheeting	"	.12
March	20	"	3,000	"	Merrimac Prints	"	.18
April	1	"	300	"	French Silk	"	1.75

47. An insurance agent whose commission was 10% on all sums received for the company, cleared $1,524.45 in one year. What were the company's net receipts from the agent?

48. What is the difference between the interest and discount of $337.50 for 1 yr. 4 mo., at 6%?

49. In 1862 the cavalry in the French army were $19\frac{1}{21}$% of the infantry; the artillery were 66% of the cavalry; the engineers were $22\frac{8}{11}$% of the artillery; and the gens-d'armes $.\dot{3}\dot{9}$ of the artillery. If the engineer corps numbered 15,000 men, what was the strength of each of the other arms?

50. Which is the more profitable, to buy 7's at 105%, or 5's at 80%?

51. A shipment of wheat was insured at $2\frac{3}{5}$%, to cover $\frac{3}{4}$ of its value; the premium paid was 44.07; the wheat being worth $.80 per bushel, how many bushels were shipped?

52. The Financial Committee of a graded school invested $33,901 in U. S. $7\frac{3}{10}$ Treasury Notes, which were at a premium of $4\frac{3}{8}$%, as a fund for the support of the school; the salaries of teachers amounted to $1,975, and $227.04 was paid for incidentals. What sum was annually left unexpended?

53. If 12 boarders eat $25 worth of bread in 2 months, when flour is $9.50 per barrel, in how many months will 15 boarders eat $60 worth of bread, when flour is $12 per barrel?

54. Required the average maturity of the following account:

H. W. SMITH.

Dr. *Cr.*

1876.		$	cts.	1876.		$	cts.
Aug. 14	To Mdse.	85	75	Sept. 14	By bal. old acc't.	97	36
" 27	" "	36	24	Oct. 17	" cash	56	00
Oct. 16	" "	174	96	Nov. 24	" "	25	00
Nov. 19	" "	94	78	Dec. 8	" sundrics	94	75

55. A merchant in New York wishes to remit 1,500 marcs banco to Hamburg, and 35 cents in New York equals 1 marc in Hamburg; eighteen cents in New York equals 1 franc in Paris, $25\frac{1}{2}$ francs equals £1 in London, 55d. in London equals 1 milree in Lisbon, and 3 milrees equals 11 marcs in Hamburg. How much will the merchant gain by this circuitous exchange?

56. The population of London in 1861 was 2,803,989, and in the following ten years there was an increase of 15.97%; what was the population in 1871?

57. The cash capital of the West Roxbury Horse Railroad Company is $40,400; the net receipts for one year were $3,312. If $\frac{5}{207}$ of the net receipts be reserved in favor of the Company, how large a dividend may be declared?

58. A, who is worth $6,845, is taxed $55.14; what is B worth, who is taxed $256.18?

59. **M. E. Banks** ***in account with*** **W. D. L. Robbins.**

Dr. *Cr.*

1875.			$	cts.	1875.			$	cts.
Feb.	25	To Mdse. on 3 mo.	721	50	Mar.	1	By cash on acc't.	500	00
Mar.	20	" " " 3 "	481	12	April	20	" Accep. at 30 da.	600	00
April	26	" " " 3 "	1750	48	June	12	" Sundries	750	00
June	24	" " " 2 "	470	50	"	27	" Cash on acc't.	800	00

Required the cash value of the above account, July 1, 1872, interest at 6%.

60. During the year ending June 30, 1870, there were manufactured in the United States 6,081,520 barrels of lager-beer; of this the State of New York made 1,992,958 barrels; what per cent. of the whole did New York manufacture?

61. The total amount of taxes paid by the brewers of the United States in 1870 was $37,306,800, of which New York paid 32$\frac{11}{100}$%; what sum did New York pay?

62. The loans and discounts of all the banks of Philadelphia amounted to $29,705,200, Oct. 19, 1861; the specie in vaults was $6,375,750; the deposits, $21,100,085; and the capital stock paid in, $11,811,500. On the first of Jan., 1863, the loans and discounts had increased 26$\frac{3}{4}$ per cent.; the specie had diminished 29$\frac{1}{3}$ per cent.; the deposits were $\frac{8}{23}$ more; and the capital stock paid in, $\frac{3}{5}$ of one per cent. less than in Oct. 1861: loans, discounts, and specie being resources; deposits and capital stock being liabilities, how much were the resources in excess of the liabilities, Jan. 1, 1863?

63. A stack of hay will keep 24 cows or 18 horses one week. How many days will it keep 5 cows and 5 horses?

64. $1,200$\frac{76}{100}$. BOSTON, Feb. 1, 1874.

Six months after date I promise to pay KNOWLES, LELAND & Co., or order, twelve hundred and $\frac{76}{100}$ dollars, with interest, for value received. S. M. SMITH.

Indorsed as follows: April 16, 1874, $215.77; Aug. 1, 1874, $317.50; Dec. 16, 1874, $315.75. How much was due April 1, 1875?

65. A farmer bought 100 oxen, cows, and sheep for $1,160; there were 6 times as many cows as oxen, and 3 times as many sheep as cows; the oxen cost twice as much per head, and the sheep $\frac{1}{5}$ as much, as the cows. How many oxen, cows, and sheep were bought? and at what price?

66. A merchant pays $10,050 for a stock of goods; he sells them at an advance of 33⅓%; the expenses connected with the business are $1,750. How much does he gain?

67. The population of Illinois in 1860 was 1,711,951, and in 1870, 2,539,638. The population of Missouri in 1860 was 1,182,012, and in 1870, 1,715,000. Which State had the greater per cent. increase, and how much?

68. Chicago had 109,260 inhabitants in 1860, and in 1870, 298,983. St. Louis had 160,773 inhabitants in 1860, and 310,864 in 1870. What per cent. greater was the increase of Chicago in 10 years than of St. Louis?

69. If the use of $250 for 1 yr. 8 mo. is worth $30, how much is the use of $425.50 for 3 yr. 7 mo. 25 da. worth?

70. What per cent. is gained by buying oil at 80 cents a gallon, and selling it at 12 cents a pint?

71. A man bought a farm of 160 acres at $32 per acre; he paid $200 for fencing, $150 for repair of buildings, and $18 for improving the grounds; at what price per acre must it be sold to gain 25% on the entire cost?

72. The taxable property of a School District is $756,000; a Union School-house is to be built, worth $24,956.16; the number of taxable polls is 520, each of which is assessed $1.50. Allowing 3% for collecting, what will be the tax upon $1.00? and how much will be the tax of S. P. Norton, who pays for 2 polls, and is worth $15,420?

73. If 6 men in 8 days, working 10 hours each day, can cut 40 acres of grass, how many men in 12 days, by working 8 hours a day, can cut 96 acres?

Find the simple interest of—

74. \$1,600 for 1 yr. 3 mo., at 6%.

75. \$2,000 for 5 yr. 6 mo., at 7%.

76. \$2,964.12 for 11 mo., at 8%.

77. \$647.654 for 4 yr. 10 mo. 20 da., at 5%.

78. \$2,870 for 1 yr. 6 mo., at $6\frac{1}{2}$%.

79. \$1,500 for 6 mo. 24 da., at $7\frac{1}{2}$%.

80. \$4,500 for 10 da., at 10%.

81. \$116.20 for 2 yr. 6 mo., at 7%.

82. \$564.58 for 3 yr. 5 mo. 12 da., at 6%.

83. \$1,700 for 28 da., at 8%.

84. \$600 for 9 yr. 6 mo., at $4\frac{1}{2}$%.

85. \$7,266.28 for 12 mo., at $10\frac{1}{4}$%.

86. \$1,315.913 for 2 yr. 8 mo. 29 da., at 7%.

87. \$215.34 for 4 yr. 6 mo., at $3\frac{1}{2}$%.

88. \$145.20 for 1 yr. 9 mo. 27 da., at $12\frac{1}{2}$%.

89. £236 for 3 yr., at 5%.

90. £482 for 4 yr. 6 mo. at $3\frac{1}{2}$%.

91. £946 12s. 4d. for 2 yr. 4 mo. at $3\frac{4}{5}$%.

92. A house being rented for \$12 a month pays $7\frac{1}{2}$ per cent. interest; what is the value of the house?

93. A western grain-dealer bought wheat as follows, viz.: 400 bushels of red wheat at \$1.40; 800 bushels of white wheat at $\$1.62\frac{1}{2}$; and 300 bushels of spring wheat at \$1.20. He shipped the whole to his correspondent in Albany, who sold the first kind at an advance of 15%, the second at an advance of 20%, and the third at \$1.15 per bushel: deducting from the gross proceeds his commission at 3%, \$108.23 for expenses, he remitted to the consignor the net proceeds. What was the rate of the grain-dealer's gain?

94. If \$400 gain \$16 in 8 months, what is the %?

95. A town levies a tax for building a bridge, which costs $2,520 ; allowing 4% for collecting, for what sum must the tax be levied?

96. A flour merchant in New York remitted to his correspondent in Chicago the proceeds of a consignment amounting to $2453.75 per draft, which he purchased at the expense of the consignor, at 1½% premium. What was the amount of the remittance, his commission being 2½%?

97. The population of New York City in 1870 was 926,341, which was an increase of 14.6% in 10 years; how much was the population in 1860?

98. The population of San Francisco in 1860 was 56,802, and in 1870, 149,482; what was the increase %?

99. According to the most recent investigations and estimates, the population of the whole earth is calculated at 1,228,000,000, and the yearly mortality at 33⅓ millions. At this estimate what is the per cent. of mortality, and how many die every minute?

100. What must be the face of a note at 60 days, the proceeds of which, when discounted at bank at 6%, are $100?

101. A house that cost $3,125, was rented for $328.12½. What per cent. did it pay on the investment?

102. A grocer bought 60 gallons of milk at 12 cents a gallon, and sold it at 5 cents a quart. How much, and what % was his gain?

103. If I sell goods for twice the cost, what % do I gain?

104. If I sell an article for one-half the cost, what % do I lose?

105. If I buy at $10, and sell at $4, what % do I lose?

106. If I retail paper at $2 a ream that cost $.50, what % is the gain?

107. What must I pay for Government 6 per cents, that my investment may yield 7½%?

108. At what rate of discount must the Tennessee 6 per cent. bonds be purchased that the person investing may secure 8% upon his money?

109. What must I pay for Pacific Railroad 6's of '95. that my investment may yield 7%?

What is the amount of—

110. $600 for 3 yr. 2 mo. 17 da., at 8%?

111. $10,550 for 243 days, at 8%?

112. $650.82 for 3 yr. 4 mo. 24 da., at 5%?

113. $9,750 for 4 mo., at 2% a month?

114. $387.16 for 1 yr. 6 mo. 1 da., at 5½%?

115. $480 for 4 yr. 9 mo. 27 da., at 7%?

116. $375 for 5 mo. 15 da., at 6%?

117. What will $1,840 amount to in 1 yr. 10 mo. 20 da., at 8% interest compounded quarterly? 2113,558 yrs 8 1m

118. If a person borrow $10,000 in Virginia, and lend it in Alabama, how much does he gain in a year?

119. If I borrow $1,000 in Massachusetts, and lend it in New York, how much do I gain in 1 yr. 3 mo. 20 da.?

120. Bought 5,000 bushels of wheat on 6 months' credit, at $1.37½; I immediately sold it at $1.35 cash, and put out the money at 6%; at the end of 6 months I paid for the wheat. Did I gain or lose by the transaction, and how much?

121. What per cent. more than $\frac{5}{9}$ is $\frac{5}{8}$?

122. What per cent. less than $\frac{20}{27}$ is $\frac{8}{15}$?

123. How many % less than 48 bu. are 40 bu. 3⅕ pk.?

124. The U. S. standard bushel contains 2,150.4 cu. in., and a bushel heap measure contains 2,747.7167 cu. in.; how many % larger is the heap than the stricken bushel?

125. If my rate of profit is $33\frac{1}{3}\%$, how must I mark goods for sale that cost me \$1.50? $\$2\frac{1}{4}$? \$7.20? $18\frac{3}{4}$ cts. a yd.? 27 cts. a pound? $67\frac{1}{2}$ cts. each?

126. A's money is 50% more than B's. How many per cent. less is B's than A's?

127. Bought 450 barrels of flour at \$8.50, which I paid for in iron at 3 cents a pound; the purchaser of the iron afterward sold $\frac{1}{3}$ of it to a scythe manufacturer. What quantity did he sell?

128. What is the difference between the simple and compound interest of \$700 in 3 years, at 5 per cent. per annum?

129. Reduce 9 sq. rd. 9 sq. yd. 7 sq. ft. 120 sq. in. to the decimal of $\frac{1}{2}$ of $\frac{3}{5}$ of $\frac{2}{7}$ of 35 A. 2 R.

130. To lose 25% on damaged goods, how should I mark those that cost me 16 cts.? 36 cts.? $\$1\frac{1}{4}$? \$1.80? \$3? $\$4.37\frac{1}{3}$? $\$6.56\frac{1}{2}$?

131. A man dying left $33\frac{1}{3}\%$ of his property to his wife; 50% of the remainder to his son; 75% of the residue to his daughter; and the balance, \$120, to a faithful servant. How much did each receive?

132. What sum must I invest in United States 6's, selling at $2\frac{1}{2}\%$ premium, to secure an annual income of \$840?

133. What is the rate of income upon money invested in 6 per cent. bonds, purchased at a discount of 10 per cent.?

134. If it require 192 reams of paper to print 2,400 copies of an 8vo book, containing 440 pages, how many reams will be required to print 6,000 copies of a 16mo book, containing 220 pages?

135. Goodman & Barbour bought bills of goods of Mellen, Claflin & Co., New York, as follows, viz.: Jan. 1, 1870, $750; June 1, 1870, $1,250; Sept. 16, $2,525; Dec. 31, 1870, $895.65: they bought on time, paying legal interest. What was their whole indebtedness May 1, 1871?

136. What must I pay for U. S. 6 per cents, that the investment may yield $8\frac{1}{3}$ per cent.?

137. A man dying, left $3,565 to be placed at interest for his son, who was 16 yr. 5 mo. 15 da. old; how much will he receive when he is 21 years old, allowing 7% interest?

138. If I sell $\frac{7}{9}$ of an acre of land for what the whole cost me, what % do I gain?

139. If I sell $\frac{5}{8}$ of an acre of land for what $\frac{3}{8}$ of it cost, what % do I lose?

140. What must be the face of a bankable note, drawn for 90 days, at 7%, so that when discounted, the borrower shall receive $100?

141. What per cent. of $\frac{8}{15}$ is $\frac{2}{5}$? of $\frac{4}{7}$ is $\frac{3}{25}$?

142. What per cent. of 750 is 17.5? of .6 is .43?

143. Thomas Baker bought a farm for $20,000 cash, or $10,000 payable in 6 months, and $12,000 in 1 yr. 6mo.; he chose the latter mode of payment. Money being worth 1%, did he gain or lose, and how much?

144. What will be the difference in the cost per yard to the American merchant who buys his cloths in Paris at $4 a yard, and pays 30% duties on them, if the price in Paris be reduced to $3 a yard?

145. Sold grain on commission at 5%; invested net proceeds in groceries at 2% commission. My whole commission was $70. What was the value of the grain and the groceries?

146. If 300 sheep require 150 A. 156 P. of pasture, how many acres will 450 sheep require?

+ *147.* I sent $12,300 to my agent in New York, with which to purchase flour at $10 per barrel, after deducting his commission of $2\frac{1}{2}\%$. How many barrels of flour did I receive?

148. A manufacturer effected an insurance upon his factory and machinery, valued at $20,000, paying an annual premium of 2%; in the second year the establishment was damaged by fire to the amount of $1,560. How much did he save by the insurance?

149. What sum must I invest in U. S. 5-20's of '82, at $94\frac{3}{4}\%$, brokerage $\frac{1}{4}\%$, to secure an annual income of $1,800?

150. How much must I invest in U. S. 7-30's, at $106\frac{1}{4}\%$, that my annual income may be $2,044?

151. A man wishes to borrow money, and give his note for $511.48, payable in 2 y. 11 m. 24 d., without interest. If the use of money is worth 7 per cent., how much should be paid for such note?

152. How much gold, silver, and copper in an eagle, its weight being 10 pwts. 18 gr.?

153. A can travel around a certain island in $2\frac{2}{15}$ days, B in $3\frac{1}{5}$ days, and C in $3\frac{1}{3}$ days. If they all set out from the same point, and travel the same way, in how many days will they all meet at the point from which they started?

154. A capitalist invested ⅔ of his money in R. R. stock, which depreciated 6¼% ; the remainder he invested in real estate, which advanced 15%, and thereby he gained $1,500. How much did he gain in both investments?

155. Brush, Snow & Co. failed in business ; their indebtedness was $85,000 ; their assets were, Cash, $5,000 ; Mdse., $12,500 ; Store, $25,000 : Bills Receivable, $7,500 ; the expenses of settling were 4% of the amount distributed to the creditors. What per cent. of their indebtedness can they pay?

156. Josephus relates that the battering-ram employed by Titus against the walls of Jerusalem weighed 100,000 pounds. Now if his men could move it with a velocity of 6 ft. a second, how many cannon-balls of 100 pounds each, discharged with a velocity of 1,200 ft. a second, would be necessary to strike the walls with equal force?

157. Average the following account:

GEORGE R. CATHCART.

Dr. *Cr.*

1874.		$	cts.	1874.		[illegible]	[illegible]
June 24	To Mdse.	630	00	June 27	By draft at 30 da.	[illegible]	[illegible]
Sept. 12	" "	428	00	Aug. 20	" cash	280	00
Oct. 23	" "	440	00	Oct. 8	" "	140	00

158. Three persons purchased a block of tenements for $350,000, of which A paid $150,000 ; B, $80,000 ; C, $120,000 ; the net proceeds of the rent were $21,000. How much should each receive?

159. Having $32,300 to invest, I can buy Georgia 6's at 85%, or Georgia 7's at 95% ; how much more profitable will the latter be than the former?

160. A and B engage in trade and invest $21,000. A's share of the gain or loss is to be $\frac{2}{3}$, B's $\frac{1}{3}$. At the end of a year they find that their assets are $35,000, and their liabilities are $15,500. How much is their net capital, and what is each partner's share of the gain or loss?

161. How much was due Jan. 1, 1874, on the following account, allowing interest semi-annually, at 6% per annum?

IRVING SAVINGS INSTITUTION *in account with* JAMES C. HUGHES.

Dr. *Cr.*

1872.		$	cts.	1872.		$	cts.
June 4	To Cash,	475	00	Sept. 14	By check,	165	00
Nov. 1	" "	250	00				
				1873.			
1873.				July 25	" "	420	00
Feb. 24	" draft,	200	00	Dec. 8	" "	180	00
Sept. 10	" check,	156	00				

162. Three merchants have an interest in a steam vessel; A puts in $960 for six months; B, a sum unknown, for 12 months; C, $640 for a time not known when the accounts were settled; A received $1200 for his share, stock and profit; B, $2400 for his, and C, $1040 [illegible]. What was B's stock, and C's time?

163. In the foregoing question A's gain was $240 during 6 months; B's, $800 during 12 months, and C's, $400 during 15 months, and the sum of the products of their stocks and times was 34560. What were their stocks?

164. In the same question the sum of the stocks is $3200; A's stock was in trade 6 months; B's, 12 months, and C's, 15 months; at the settling of accounts, A is paid $240 of the gain; B, $800, and C, $400. What was each person's stock?

165. A grocer uses for a 1 lb. weight one that weighs only *15.75 oz.*; what % does he gain by his dishonesty?

166. How much money must be invested in stocks at 5% advance, in order to gain $520 by selling at 9% advance?

167. A speculator bought 420 bales of cotton, each bale containing 488 pounds, at 19 cents a pound, on a credit of 9 months for the amount. He immediately sold the cotton for $42,122.23 cash, and paid the debt at 8% discount; how much did he gain?

168. What rate of premium does U. S. 6's 5–20 bear in market when an investment pays 5½%?

169. At what price must U. S. 7–30's be purchased that the investment shall yield 8%?

170. Required the footing of the following bill:

CHARLESTON, May 1, 1875.

CHAS. H. CHILDS,

Bo't of WM. BENNETT.

50 chests Tea,	each Hg 30.5	@	$2.50
22 sacks Java Coffee,		"	40.00
15 bbls. Coffee Sugar,	each Hg 110	"	.32
20 " Crushed "	" " 95	"	.38
60 boxes Raisins,	" " 12	"	.50

Rec'd Payment,

WM. BENNETT.

171. A note for $800, dated Jan. 15, 1869, on interest after 6 mo., at 7%, has the following endorsement: Apr. 18, 1870, $100; Jan. 1, 1872, $70; June 15, 1873, $62.50. Required the balance due July 15, 1874.

172. Find the compound interest of $476 for 4 yr. *8 mo. 15 da., at 6* per cent. per annum.

173. How long before the voting is ended in San Francisco, Long. 122° 26′ 15″ W., can the voters of Portland, Me., Long. 70° 14′ 34″ W., telegraph to San Francisco, the close of their election, the polls closing in both places at sunset?

174. A man's property is insured at 2½%, payable annually; in how many years will the sum of the premiums equal the policy?

175. A broker charges me 1⅓% commission for purchasing some uncurrent bank bills at 25% discount; of these bills, three of $10 each, and one of $50 became worthless; I dispose of the remainder at par, and thus make $520. What was the amount of bills purchased?

176. JAMES C. SPENCER,

To HENRY A. SCOTT, *Dr.*

1876.

Sept.	4.	To	100	yd.	Cassimere,	@ $2.50 . . .	$250
"	25.	"	3,000	"	French Prints,	" .12 . . .	360
Oct.	17.	"	1,200	"	Sheeting,	" .08 . . .	96
"	31.	"	400	"	Oil Cloth,	" .50 . . .	200
Nov.	17.	"	Sundries				350

When is the above bill due, per average?

177. A merchant in New York imports from Havana 250 hhd. of W. I. molasses, each containing 63 gallons, invoiced at $.35 per gallon; 150 hhd. of B. coffee sugar, each containing 500 pounds, invoiced at $.06 per pound; 50 boxes of lemons, invoiced at $2.50 per box; and 95 boxes of sweet oranges, invoiced at $3.00 per box. What was the whole amount of duty, estimated at 24% on molasses and sugar, and at 9% on lemons and oranges?

178. A garden whose breadth is 9 rods, and whose length is $1\frac{2}{3}$ its breadth, has a wall $3\frac{3}{4}$ feet thick around it. What was the cost of digging a trench $2\frac{1}{2}$ feet deep, in which to lay this wall, at $1\frac{3}{5}$ cents per cubic foot?

179. At 7 per cent. interest, compounded semi-annually, what debt will $3,475.50 discharge in $2\frac{1}{2}$ years?

180. Three men engaged in the manufacture of pails; A put in $2,550 for 8 months; B, a sum not specified for 12 months; C, $1,080 for a time not specified. A received for his stock and profit $3,400; B, $4,200 for his; C, $1,485 for his. Required, B's stock and C's time.

181. At what rate per annum, simple interest, will any sum of money double itself in 3, 4, 5, 6, 7, 8, and 10 years respectively?

182. At what rate per annum, simple interest, will any sum of money triple itself in 3, 5, 6, 11, and 20 years, respectively?

183. How long will it take any sum of money to quadruple itself at 7%, simple interest? 8%? 10%?

184. In what time will any sum quadruple itself at 23 per cent.?

185. Bought a hogshead of molasses for a certain sum, but 16 gallons having leaked out, the remainder was sold for 1.87\frac{1}{2}$ per gallon, at a loss of 6% on the cost. How much was the cost?

186. A merchant bo't 400 yd. broadcloth @ $3.00; he sold A 60 yd. @ $3.50; B, 125 yd. @ $3.40; C, 75 yd. @ $3.20; and the balance to D @ $2.95. What per cent. profit did he make on the whole?

187. How much ready money will now pay a debt of *$1342.50, due 125* da. hence, at $6\frac{1}{2}$ per cent.?

188. It was voted in the town of V. to raise a tax of \$166,606. Each of the 1460 polls is to be taxed \$1.10; the valuation of the property of the town is \$22,000,000. What is the tax on \$1, and what the tax of James Smith, who has real estate \$8000, and personal property \$7,000, and pays for five polls?

189. A person being asked the time of day, replied, "$11\frac{2}{3}$ times the time past noon is equal to $4\frac{1}{3}$ times the time till midnight." What was the time?

190. Which is the more profitable, to buy 8's at 120%, or 5's at 75%?

191. What is the value in current funds of \$475.75 gold, when gold is at $110\frac{1}{2}$%?

192. I bought 2,345 bushels of wheat at \$1.20, and immediately sold it at \$1.30, on a note of 6 months, which I got discounted at bank at 7 per cent. How much did I gain?

193. I sent \$9,020 to my agent in Chicago, who purchased grain at an average price of \$1.10 per bushel, and charged $2\frac{1}{2}$% commission. How many bushels did he buy?

194. On the first of Jan., 1862, there were 10,869 miles of railroad in operation in Great Britain, and the total receipts for the year were £28,565,355; the expenses were £878,681 less than the net receipts. How many dollars, U. S. currency, were the net receipts per mile, sterling bills being then worth \$8.40?

195. Three men, A, B, and C, start from the same point to travel around an island 100 miles in circumference; A travels $22\frac{2}{9}$ miles each day; B, $11\frac{3}{7}$ miles; and C, $12\frac{44}{63}$ miles. Required the least number of days in which all will be together at the point of starting, and how many times each will have traveled around the island.

196. A Southern merchant ships to his agent in Boston a quantity of sugar, consisting of 100 bbl. of New Orleans, each containing 216 lb., purchased at 6 cents per pound, and 300 bbl. of West India, each containing 210 lb., purchased at $6\frac{3}{4}$ cents per pound. The agent's account of sales shows a loss of 1% on the New Orleans, and a profit of $\frac{20}{23}$% on the West India sugar; does the merchant gain or lose on the whole consignment, and how much?

197. My garden is $10\frac{3}{4}$ rods long, and $8\frac{2}{3}$ rods wide, and surrounded by a fence $7\frac{2}{5}$ feet high; I have laid out a walk around it, within the fence, $7\frac{1}{2}$ feet wide on the two sides, and $5\frac{1}{2}$ feet wide on the ends. How much remains for cultivation?

198. A farmer exchanged 25 bu. 3 pk. 3 qt. of corn at $.80 per bushel, for 32 yd. sheeting and $8\frac{2}{3}$ yd. broadcloth. Allowing 1 yd. of broadcloth to equal in value 24 yd. of sheeting, what was the amount paid for each?

199. If I make a profit of $15\frac{5}{11}$% by selling Worcester's Dictionaries for $.85 above the cost, how much must I advance on the price to realize a profit of $32\frac{1}{2}$%?

200. A farmer sold 4 loads of oats, averaging 35 bu. 3 pk. 7 qt. each, for $$120.85\frac{1}{2}$. How much are 100 bu. 3 pk. worth at the same rate?

201. A cistern has three receiving and three discharging pipes; the first three will fill it in 24, 36, and 48 minutes, respectively, and the last three will empty it in 30, 40, and 60 minutes each. If the cistern is empty, and the pipes are opened in succession, each three minutes after the other, in the order given, how long after the last pipe is opened will the cistern be filled?

202. A broker buys stock when it is 20% above par, and sells it when it is 16% below par; what is his rate of loss?

203. A man has 6 per cent. stock, the market value of which is 75%; if he sells it, and takes in exchange 7% stock, at 10% premium, what per cent. of his annual income does he lose?

204. What would be a man's annual income in currency who holds $10,000 U. S. 10-40's, if gold is at 122½%?

205. Bought flour @ $6 per bbl. in gold, and sold the same for $8 in currency, gold being 116%; what was the gain per cent.?

206. What is gold quoted at when $1 in currency is worth 75 ct.? 80 ct.? 85 ct.?

207. In what time will $500, at 6%, simple interest, become $1,000? $1,500? $2,000?

208. An agent for a Hartford nurseryman sells 5,000 apple-trees, at $24 per hundred; 3,000 pear-trees, at $40 per hundred; 2,000 peach-trees, at $18 per hundred; 1,500 cherry-trees, at $45 per hundred; 500 plum-trees, at $45 per hundred; and 1,000 ornamental trees at $50 per hundred. What is his commission, at 25%, and how much should he return to his employer as the net proceeds, after deducting $300 for expenses?

209. How much is gained by investing $5,250 in government bonds at 105%, brokerage 1¾%, and selling the same at 116%, brokerage 1¾%?

210. A owns a farm which rents for $596.50 per annum. If he sell the same for $8,967.50, and invest the proceeds in U. S. 5-20's of '84, at 105%, paying ½% brokerage, will his yearly income be increased or diminished, and how much?

211. A man traveled $19\frac{3}{7}$ miles the first day, $22\frac{11}{21}$ miles the second day, and 19 mi. 60 rd. $15\frac{4}{7}$ feet the third day. How far did he travel in the three days?

212. A dealer in horses sold 24 for $150 each. On one-half of them he gained 30 per cent., and on the remainder he lost 20 per cent.; did he gain or lose on the whole, and how much?

213. A cotton broker in Charleston has due him in Amsterdam $5701\frac{1}{5}$ gilders, and receives the same by draft; what sum will he receive, exchange on U. S. in Amsterdam being $2\frac{2}{5}$ gilders for $1?

214. A draft on Birmingham, England, for £720 cost $3,504; what was the course of exchange?

215. What is the cost of a bill of exchange on Dublin for £381, at $$4.87\frac{7}{8}$?

216. For what sum must a store and contents, valued at $25,640, be insured, so as, in case of its destruction, to recover the entire value of the building and contents and the premium of 2 per cent.?

217. Wishing to borrow $1,000 of a Southern bank that is discounting paper at 8 per cent., I give my note for $975, payable in 60 days; how much more will make up the required amount?

218. A man sold a farm of 165 A. 112 P. at $33.50 per acre, and took a note payable in 5 mo. 15 da., at 7% interest; wishing the money for immediate use, he got the note discounted at a bank. How much did he receive?

219. I wish to line the carpet of a room, $6\frac{1}{3}$ yd. long and $5\frac{1}{2}$ yd. wide, with duck $\frac{7}{8}$ yd. wide. How many yards of lining must I purchase, if it will shrink 4% in length and 5% in width?

220. A commission merchant receives 125 bbl. of flour from A, 150 bbl. from B, 225 bbl. from C; he finds on inspection that A's is 10% better than B's, and C's is $5\frac{5}{11}$% better than A's; he sells the whole lot at $7.00 per barrel, and charges 4% commission. How much must he remit to each?

221. A New York merchant purchased 9,000 bushels of wheat, paying at his option $1 per bushel, cash, or $1.10, on 3 months credit; which would be the more advantageous, to purchase on credit, or borrow the money from the bank at 7 per cent. and pay cash?

222. If a merchant wishes to draw $1,275 at bank, for what sum must he give his note at 60 days, discounting at 6%?

223. What is the face of a note at 60 days, the proceeds of which when discounted at bank, at 8%, are $961.35?

224. A man has two sons, one living in New York, the other in Massachusetts; he wishes to place at interest $1,000 for each, so that the amounts shall be the same in 5 yr. 7 mo.; he supposes he has accomplished his object by loaning the given principals, one in New York at simple interest, the other in Massachusetts at compound interest, payable semi-annually. What is the difference between their respective amounts?

225. Bought 42 lb. of coffee at the rate of $3\frac{1}{2}$ lb. for $1.00, and 75 lb. more at the rate of 7 lb. for $$2.33\frac{1}{3}$; sold the whole at the rate of 9 lb. for $3.25. How much did I gain or lose?

226. If 7 cwt. 68 lb. of sugar cost $90.24, how much sugar can be purchased for $300.80?

227. Paid $2,797.20 duty on 126 watches, at 30% *ad valorem;* what was the invoice price, and at what price must they be sold to gain 25%?

228. What is the face of a 4 mo. note which yields $3,375 discounted at 1% a month?

229. Bought cloth at $4.00 per yard; what must be my asking price that I may fall on it 12%, and still make 21% on my purchase?

230. A, B, and C engaged in partnership with a joint capital of $3,000; A putting in stock for 8 months, B for 9 months, C for 12 months; A's part of the profits was $64, B's $81, and C's $84. Required the capital of each.

231. The population of the United States in 1860 was 31,446,400, and the number of deaths reported was 1 for every 80 citizens; $\frac{9\frac{1}{2}}{20}$ of the deaths were of females. How many of each sex died during the year?

232. A merchant bought 64 yd. broadcloth, which was 1⅞ yd. wide, for $5 per yard; but the cloth being wet, shrunk 4½ per cent. in width, and the same in length. For what must the cloth be sold per square yard to gain 20 per cent.?

233. What is the net value in Chicago, gold, of a sum due in Paris of 6,300 francs, which is sent to Liverpool, at 1% commission; exchange, 25.20 francs to £1; thence to Boston, after deducting ½% commission; exchange being quoted at $4.90; thence to Chicago in a check at ½% discount?

234. One-fifth is what per cent. of three-fourths?

235. What is the cash balance of the following account on Dec. 31, at 7 per cent. ?

H. H. BRIDGMAN.

Dr, *Cr.*

1876.		$	cts.	1876.		$	cts.
March 3	To Sundries	956	72	Mar. 18	By Sundries	192	08
April 3	" Mdse. on 3 mo.	572	74	" 21	" Cash on acc't.	400	00
" 22	" " " 3 "	750	52	April 8	" " " "	650	00
May 13	" " " 3 "	160	00	May 18	" " " "	100	00
June 15	" Sundries	297	52	June 27	" " " "	168	00

236. I can sell a certain piece of property for $9,000 cash, or for $4,750 payable in 9 months, and $5,200 payable in 1 year; how much shall I gain by accepting the second offer, if money is worth 9%?

237. A gentleman deposited $100 in a savings bank for the benefit of his son, at compound interest, at a semi-annual rate of $2\frac{1}{2}$%; he was to receive the amount as soon as it became $268.50; allowing that the deposit was made when the son was one year old, what was his age when he received the money?

238. A capitalist invested a certain sum of money in U. S. 6's 5-20 at $107\frac{1}{2}$%, and twice as much in U. S. 10-40's at $98\frac{1}{2}$%, brokerage in each case $\frac{1}{2}$%. His income from both investments was $3,348. How much did he invest in each kind of stock?

239. A quantity of English cloths cost in store $3,742.70, after paying 25% duty, and other charges of $56.50; what were they invoiced at?

240. I exchanged 60 Ohio State bonds of $1,000 each, at $8\frac{1}{2}$% premium, for Indiana bonds of $200 each, at 5% premium. How many of the latter did I receive?

241. If 12 oz. of wool make 2⅞ yd. of cloth, 1¼ wide, how many pounds of wool are required to make 115 yds. of cloth, 1 yd. wide?

242. A and B contracted with Gwinn & Co. to erect a cotton-mill for $50,000. Not wishing to be burdened with the salary of a book-keeper, it was arranged that each partner should keep a strict account of all his expenditures and receipts, and report at the completion of the job, at which time they would have a general settlement. At the time of settlement they found their affairs standing as follows, viz.: A had paid out for building material and wages $16,750.50, and had received from Gwinn & Co. $12,790; B had paid out for building material and wages $20,186.75, and had received from Gwinn & Co. $15,842. There was due the hands and for material, $4,729.38. What was their entire profit? How much was due from Gwinn & Co.? How much should be paid to A and B respectively?

243. A house that cost $15,725, rents for $1,478.15; the insurance is ⅘%, and the repairs $\frac{6}{10}$% each year. What rate of interest does it pay?

244. A merchant having sold a number of yards from a piece of cloth, found there were 8.75 yards left, which was 65 per cent. less than the quantity cut off. Required the number of yards in the piece at first.

245. The capital stock of the Boston and Worcester Railroad Company is $4,500,000, and its debt $126,000. Its gross earnings in 1861 were $928,932, and its expenses $520,338. If the company paid expenses, interest of 6% on its debt, and reserved $18,534, what dividend would a stockholder receive who owned 25 shares of $100?

246. How many bushels of barley at $.80 in gold can be bought for $385.56 currency, when gold is at 118⅛% ?

247. How much better per cent. in gold will a bond and mortgage at 7% pay than U. S. 5–20's of '82 at 120, the selling price of gold?

248. Bought a bill of goods for $1,500, ⅓ payable in 3 months, ⅓ in six months, and the remainder in 9 months. How much ready cash ought I to pay for the goods, money being worth 6 per cent.?

249. If a ship sail 5 mi. 129⅛ rd. per hour, how long will it be in going 1,618 mi. 98.254 rd.?

250. If $990.73 gain $55.67 in 9 mo. 19 da., what principal is required to gain $31.12 in 2 yr. 5 mo. 26 da.?

251. Find a number between 893 and 931, which shall have with each the same greatest common divisor that they have with each other?

252. What % in advance of the cost must a merchant mark his goods so that, allowing 4% of his sales for bad debts, an average credit of 3 months, and 8% of the cost of the goods for expenses, his net gain may be 15% of the first cost of the goods, money being worth 7%?

253. How much more can a bank make in 528 days, with $10,000, by discounting notes at 45 days' time, than by discounting them on 30 days, the rate of discount being 6%, and the profits in both cases retained in bank till the expiration of the time?

254. Sold Hiram Jones goods to the amount of $2,084, on credit for 3 mo. from Sept. 20, 1872. Oct. 8, he paid me $520; Nov. 20, $340; Dec. 25, $800; Jan. 12, 1873, $100. When, in equity, ought I to receive the balance?

255. I owe a man the following notes: one of $500, due April 1; one of $750, due July 15; and one of $1,750, due Sept. 10. The holder wishes to exchange them for two notes of $1,500 each, and wants one to fall due May 10; when should the other be made payable?

256. A pork merchant charged 12% commission, and cleared $2,251.30, after paying out $1,565.24 for all expenses of packing; if the pork cost him $.06½ a pound, how many pounds did he pack?

257. How many gallons in 500 liters?

258. How many bushels in 368 kiloliters?

259. In 240 myriagrams how many pounds?

260. In 20 lb. 12 oz. avoirdupois how many myriagrams?

261. How many hectares in 4,784 sq. yards?

262. In 4 mi. 200 rd. 5 yd. how many kilometers?

263. Bought 800 bu. of wheat at $3, and sold the same at $9 per hectoliter; how many Hl. did I sell, and how much did I gain or lose?

264. A merchant has $216 due him, to be paid in 7 months; but the debtor agrees to pay one-half ready money, and $\frac{3}{4}$ of the remainder in 6 months. What time should he be allowed for paying the balance?

265. The charter of a new railroad company limits the stock to $1,500,000, of which 3 installments of 10%, 20%, and 40%, respectively, have been paid in; the cost of construction has reached $850,000, and the estimated cost of completion is $850,000. If the company call in the final installment of its stock, and assess the stockholders for the remaining outlay, what will be the rate %?

266. Find the value of $\frac{2}{3}$ of $4\frac{3}{8}$ of $\frac{3\frac{5}{6}}{\frac{2}{7}}$ of a shilling?

267. Find the value of $\frac{5}{9}$ of $\frac{3\frac{2}{3}}{\frac{5}{6} \text{ of } 1\frac{2}{9}}$ of a long ton?

268. A sells goods which had cost $800, to B at an advance of $12\frac{1}{2}$%; B sells them to C, and gains $11\frac{1}{9}$% of what he had paid. What per cent. would A have gained had he sold the goods to C for the same which B received?

269. There was paid in New Orleans $7,840 for £1,600 draft on Liverpool. At what rate of exchange was it purchased?

270. How much butter, at $.$37\frac{1}{2}$ a pound, must be given for 12 gal. 3 qt. of molasses, at $.75 a gallon?

271. I sold $\frac{1}{4}$ of my goods at an advance of 25%; $\frac{3}{10}$ of them at a loss of 8%; $\frac{1}{20}$ of them at a profit of 30%, and $\frac{1}{5}$ of them at a discount of 20%. For what % of the cost must the remainder be sold in order to lose 5% on the whole?

272. $1,000. CHARLESTON, S. C., Mar. 1, 1870.

For value received I promise to pay James Gray, or order, one thousand dollars, with interest.

T. M. CURTISS.

On this note were the following indorsements: Sept. 1, 1870, $300; Jan. 16, 1871, $200; March 1, 1871, $200; May 1, 1871, $200. How much was due July 4, 1871?

273. The stock of three partners, A, B, and C, was $2,400, $2,000, and $1,800, and their gain $768, $960, and $1,152 respectively; C's stock continued in trade 4 months longer than B's. How long was the money of each in trade?

274. If 12% of what is received for goods is gain, what is the gain %?

275. If it require $900 to support a family of 12 persons 41 weeks and 1 day, how much at the same rate will be required to support a family of 24 persons 22 weeks 6½ days?

276. Subtract 2 mi. 10 rd. 5 yd. 2 ft. from 2 mi. 11 rd. 1 ft. 5 in.

277. How large a draft on Havana can be purchased for $3,394.80, at 3½% premium?

278. What must be the face of a note, drawn for 4 months, at 7½%, to pay a cash debt of $1,486.90?

279. At what price must I sell my residence to make $3750, at a gain of 15%?

280. What is the face of a note on which $12.40 is discounted for 3 mo. at 6% bank discount?

281. The earth moves 19 miles per second in her orbit. How far does she travel from 7 h. 30 min. A.M. till 5 hr. 15 min. P.M.?

282. The greatest common divisor of three numbers between 18 and 100 is 18, and their least common multiple is 540. What are the numbers?

283. If 97 sheep are bought for $\$100\frac{22}{25}$, how much should be paid for 25 sheep at the same rate?

284. I sold goods at an advance of 20%, and invested the money received, in goods, which I sold at a loss of 10%, and with the sum received, purchased goods, which were sold at a discount of $16\frac{2}{3}$%. What was the gain or loss per cent.?

285. Reduce $.\dot{4}$, $.\dot{0}\dot{3}$, $\dot{2}\dot{3}$, and $.\dot{5}3\dot{4}$ to common fractions.

286. Reduce to circulating decimals $\frac{7}{9}$, $\frac{13}{15}$, $\frac{5}{37}$, and $10\frac{3}{11}$.

287. Borrowed of my neighbor $500, for 1 yr. 3 mo., at 6%; not being able to pay at the end of the time, my neighbor agreed to let it run till the end of the second year at simple interest, but he was obliged to borrow $535.88⅓ for 9 mo. at the same rate. How much more did my neighbor owe at the end of the year than I?

288. How many oranges must a boy buy and sell to make a profit of $9.30, if he buys at the rate of 5 for 3 cents, and sells at the rate of 4 for 3 cents?

289. Having used my carriage three years, I sold it for $66, which was 40% less than the cost. What was the cost?

290. What is the value of 25 hhd. sugar, each weighing 12 cwt. 91 lb., draft 3 lb. per cwt., and tare 10 lb. per cwt., at $11.625 per cwt. net?

291. A man in New York having $28⅓, gave ⅔ of it for 5⅔ bushels of clover seed. What was the price per pound?

292. A merchant imported from Bremen 40 pieces of linen of 35 yards each, on which he paid for duties, at 26%, $218.40, and other charges to the amount of $131.60. What was the invoiced value per yard? and the cost per yard after duties and charges were paid?

293. Purchased a house for $12000, a horse for $325, and furniture for $2808.75. The same was sold for $18342.103. What was the gain %?

294. I received an 8% dividend on New York city railroad stock, and invested the money in the same stock at 80%. My stock having increased to $13,750, what was the amount of my dividend?

295. How many meters of shirting, at $.25 per M., must be given in exchange for 300 Hl., at $1.20 per Hl.?

296. A buyer expended equal sums of money in the purchase of wheat, rye and oats; in the sales he cleared 7% on the wheat, 5% on the rye, but lost 15% on the oats; the whole amount received was $1,782. What sum did he expend for each kind of grain?

297. Bought oats at $.47 per bushel, and sold them at $.56. What was my gain per cent.?

298. A merchant bought 240 M. of silk at $2, and sold it at $1.95 per yard; did he gain or lose, and how much?

299. If molasses cost 20% less than $.75 a gallon, and it be sold at a profit of 25%, at what price is it sold?

300. The quick step in marching being 2 paces of 28 inches each per second, what is the rate per hour?

301. A capitalist holding bonds of the Columbus and Indianapolis Railroad to the amount of $27,000, exchanged them at the market price of 96% for capital stock of the same company, worth 81%; the bonds drew 8% annually, while the stockholders received two dividends during the year; the first of $3\frac{1}{2}$%, and the second of 4%. How much did the capitalist gain annually by the exchange?

302. How much time must a general allow for a detachment of soldiers, marching quick step, to reach a place 50 miles distant, giving the men a halt of $1\frac{1}{3}$ hours?

303. If a man dig a cellar 8 feet square and 6 feet deep in 2 days, how long will it take him to dig a similar one 12 feet square and 7 feet deep?

304. In what time will any sum of money amount to 10 times itself at 7 per cent.?

305. A merchant sold a quantity of goods for $480, and loses at the rate of 9 per cent. What ought he to have sold them for to realize a profit of 7 per cent.?

306. The cost in store of 40 puncheons of Jamaica rum, 84 gal. each, was $1,262.86; duty, 15%; leakage, 2%; and charges $106.68. What was the cost per gallon in Jamaica?

307. If the interest of $6,786.24 for 1 yr. 10 mo. 16 da. is $1,273.89, what will be the amount of $5,772 from Oct. 26, 1867, to Apr. 12, 1872?

308. Find the day of maturity, the time to run, and the proceeds of the following note:

$\$575\frac{63}{100}$. CHICAGO, March 2, 1875.

Six months after date, I promise to pay to the order of Marks and Willis, five hundred seventy-five $\frac{63}{100}$ dollars, value received. HIRAM BENNET.

Discounted at a bank, Apr. 10, at 6%.

309. The British Industrial Exhibition remained open 141 days, and the average number of daily visitors was 42,831; the whole amount received for admission was £6,039,171. What was the price of admission?

310. What per cent. of 24% is $\frac{1}{3}$ of 54%?

311. $\frac{3}{7}$ of 28 is $\frac{4}{11}$ of how many % of 55?

312. If 8 men can perform a piece of work in 32 days, how many men must be added to the number to perform the work in 8 days?

313. In the examination of a class, 160 questions were submitted to each of the five members; A answered 130; B, 125; C, 115; D, 122; and E, 158. What was the standing of the class?

314. How many square feet in the four walls of a room 36 ft. long, 30 ft. wide, and $10\frac{1}{2}$ high?

315. A merchant sold flour at $6.50 per barrel, and gained 10%; he afterwards sold the same kind of flour at $8.25 per barrel. What per cent. did he gain at the latter price?

316. How shall a merchant tailor mark coats that cost $8.00, so as to fall 20% from the marked price, and yet make 25% on the coats?

317. What must $2\frac{1}{4}$ lb. of tea be sold for, if $22\frac{1}{2}$ lb. cost $14, and the retail profit is 20%?

318. A liquor dealer receives an invoice of 300 dozen bottles of porter, rated at $1.50 per dozen; allowing 2% for breakage, what will be the duty at 24%?

319. If the transportation of 8 hhd. sugar, each weighing $12\frac{1}{2}$ cwt., 25 leagues, cost $65, what must be paid for the transportation of 80 tierces, of $2\frac{1}{2}$ cwt. each, 75 leagues?

320. I wish to obtain at a bank $840.25; for what sum must I give my note payable in 5 months and 21 days at 6%?

321. A portion of a cargo of tea being damaged, was sold at $1.20 per pound, and at a loss of $16\frac{2}{3}$%. At what rate must the remainder be sold to gain 25%?

322. What principal will gain $213, at $7\frac{1}{2}$ per cent., in 2 yr. 4 mo. 12 da.?

323. A man owed $420, due Oct. 1, 1871; he paid part of it Aug. 15, 1871, and the rest Jan. 1, 1872. What were the payments?

324. If 372 men, in $7\frac{1}{3}$ days, of 11 hours each, dig a canal of 7 degrees of hardness, 310 yards long, $5\frac{1}{2}$ yards wide, and $2\frac{1}{3}$ yards deep, in how many days, of 8 hours each, will 27 men dig a canal of 4 degrees of hardness, 270 yards long, 7 yards wide, and $3\frac{1}{2}$ yards deep?

325. A merchant bought 2 pieces of goods containing 60 yds. each, at $.75 a yard; he also paid $\frac{3}{4}$ of a cent per yard for freight. For what must he sell the goods per yard to make a profit of 25%, if the pieces fall short in measuring $2\frac{1}{2}\%$?

326. A person paid a tax of 5 per cent. on his income. What must his income have been if, after he had paid the tax, there was $5,671.50 remaining?

327. The area drained by the ponds and lakes which supply the city of Brooklyn with water is $62\frac{1}{2}$ square miles, upon which the average annual fall of rain is $38\frac{1}{2}$ inches; the average daily supply to the city is 20,000,000 gallons. How much water falls for every gallon conveyed to the city?

328. If 11 lb. of cheese are equivalent in value to 7 lb. of meat, and 21 lb. of meat to 4 bu. of corn, and 20 bu. of corn to 22 bu. of rye, and 9 bu. of rye to 2 cords of wood, how many pounds of cheese must be given in exchange for 12 cords of wood?

329. What is the compound interest of $512.50 for 3 yr. 6 mo. 21 da., at 8%?

330. A store and its goods are worth $12,740. What sum must be insured at 2% to cover both property and premium?

331. The net proceeds of the sale of 1,000 tons of hay, at $20 per ton, after deducting $875 for charges, were $18,325. What rate of commission was charged?

332. What will be the cost in New York of a bill of exchange on Liverpool for £432, at $$4.89\frac{1}{2}$?

333. What is the least common multiple of $6\frac{1}{2}$, $9\frac{3}{4}$, $10\frac{5}{6}$, and $7\frac{5}{16}$?

334. A merchant paid $4500 for a bill of exchange on Paris, at the rate of 5.22 francs to $1. What was the face of the bill?

335. An army which has been three times decimated in battle now numbers only 14,580 men. What was the original number in the army?

336. Sold 2,978 bushels of wheat at $2.00 per bushel; invested the proceeds in sugar, as per order, reserving my commission of 5% for selling and 1½% for buying, and the expense of shipping, $53.37. How much did I invest in sugar?

337. A and B had the same amount of money; A spent 76% of his money for land, and B lost by gambling a sum equal to 28½% of what both had at first, when both together had $50.25. What sum had each at first, and how much had each left?

338. There are 20 colleges in New York, having an aggregate of 118,060 volumes in all their libraries. What is the aggregate value of these libraries, at $⅞ per volume?

339. What per cent. of a number is 40% of ⅗ of it?

340. Divide $435 among A, B, and C, so that ½ of A's money shall be equal to ⅔ of B's, or ¾ of C's.

341. James Haynes buys a bill of merchandise in New York, at cash price, to the amount of $2,973.80, and gives in payment his note at 3 months at 7½%. What must be the face of the note?

342. If A owes $500 due in 6 months, $400 due in 4 months, and $300 due in 7 months, and pays ⅔ of the whole in 3 months, when ought the remainder to be paid?

343. The interest of $4,000 for 1 month and 6 days is $36; what is the rate per cent.?

344. If 6 men do as much work as 14 women, and 10 women as much as 27 boys, and 14 boys as much as 25 girls, and 18 girls bind 250 sheaves in an hour, how many sheaves can 24 men bind in the same time?

345. How far does a man walk in planting a field of corn 207 ft. square, the rows being 3 feet apart and 3 feet from the fence?

346. A merchant owes $440, payable in 20 months, and $896, payable in 24 months; the first he pays in 5 months, and the second in one month after that. How much should he pay, allowing 8 per cent. per annum?

347. Willis, Markham & Co., of New Orleans, import from Liverpool 8 pieces of Turkey carpeting, 35 yd. each, at 6s. per yd., duty 33⅓%; 300 yd. woolen goods, at 4s. per yd., duty 18%, and 25 pieces of silk, 18 yd. each, at 2s. 6d. per yard, duty 24%. Required the whole amount of duty, exchange being at par.

348. Paid $63.90 duties at the rate of 9 per cent. on 50 casks of raisins, tare 15 lb. per cask; allowing the gross weight of each cask to have been 115 lb., what was the invoice value per pound?

349. What is the cost of a draft on Paris for 6,500 francs, exchange being 5 fr. 20 c. for $1?

350. What cost in Baltimore a bill on St. Petersburgh for 2,840 roubles, at 1½% premium, the par of exchange being $.765 for 1 rouble?

351. How many feet of boards will it take to inclose a garden 40 ft. 6 in. long, and 30 ft. 3 in. wide, with a close fence 7 ft. 6 in. high?

352. If $\frac{3}{7}$ of a hogshead of oil is worth $48, what is the value of $\frac{5}{8}$ of the remainder?

353. Bought a quantity of wine for $675.32½, at $.85 per gallon; but a part having leaked out, the remainder was sold at 40% advance, and the original cost was realized. What quantity leaked out?

354. Bought of M. J. & Co. as follows:

April 1, 1870, on 60 days' credit, a bill of $250
" 20, " " 90 " " " 600
July 5, " " 30 " " " 400

Also, sold to M. J. & Co.:

April 5, 1870, on 2 months' credit, a bill of $450
May 20, " " 3 " " " 600

From what date ought the balance of the debt to draw interest?

355. Gave my note at a bank for $1,255.38, payable in 4 mo. 12 da.; if discounted at 6%, what sum did I receive?

356. A merchant sold goods for $600, and gained 25%; he invested the proceeds in flour, on which he lost 20%; did he gain or lose by the transaction, and how much?

357. Four per cent. of 325 bushels is what per cent. of 3½ per cent. of 200 bushels?

358. A owes B $600 due in 4 months, and $840 due in 6 months; B owes A $1,600 due in 7 months. If A should make present payment of his debts, when ought B in justice to pay A?

359. If $\frac{3}{4}$ of A's money equals $\frac{6}{7}$ of B's, what part of B's money equals $\frac{7}{9}$ of A's?

360. One thousand dollars was to be divided among A, B, and C, in the ratio of $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{5}$, but C relinquished his share; how much did A and B each receive?

361. A wholesale merchant sent a quantity of goods into the country to be sold at auction, on a commission of $4\frac{1}{2}\%$. What amount of goods must be sold, that his agent may buy produce with the avails to the amount of $1,910, after retaining a commission of 2%?

362. Bought a number of bales of velvet, each containing 126 yards, at the rate of $10 for 7 yards, and immediately sold the whole at the rate of $13 for 9 yards, thereby making $26. Required the number of bales?

363. If eggs are bought at the rate of 10 for $.25, and sold at the rate of 6 for $.16, how many dozen must be sold to gain $20?

364. In what time at 12% will $240 amount to $720?

365. I have $58,650 to invest, and can buy New York Central 6's at 102%, or New York Central 7's at 115%. How much more profitable will the latter investment be than the former per year?

366. If the annual rent of 23 A. 67 P. of land be $187.35, how much will be the rent of 71 A. 20 P.?

367. If I rent a house which cost $9000, for $900 a year, and lay out $150 in repairs, what % interest do I receive?

368. I got a note of $800, payable in 4 months, discounted at a bank at 6%, and put the money received upon interest at the rate of $7\frac{1}{5}\%$. When the note matured, I paid it with the proceeds of a bank-note, at 5 mo., discounted, also at 6%, and, as before, paid this with the proceeds of a third, which matured in one year from the date of the original note, at which time I collected the sum due, and paid the bank-note. What did I gain by the transaction?

369. How many yards of cloth, $1\frac{1}{3}$ yards wide, are required for a garment containing 23 square yards, if the cloth in being sponged shrinks 10% in length and 8% in width?

370. What are the proceeds of a note of $5,600, payable in 6 months, discounted at $7\frac{1}{4}$%?

371. If the interest of £179 12s. 11d. for 1 yr. 7 mo., is £14 4s. $5\frac{1}{4}$d., what is the rate per cent.?

372. Three persons found $120, which they agreed to share in the proportions of 5, 7, and 8. How much did each receive?

373. A commission merchant sold goods to the amount of $59,376.50, for which he charged a commission of $\frac{5}{8}$ of one per cent. What was his commission?

374. A has $12,000 loaned in Mississippi, and $10,600 loaned in New York. On which sum is the legal interest the greater, and how much per year?

375. If $\frac{3}{7}$ of a ton of coal be sold for what $\frac{2}{3}$ of it cost, what is the gain per cent.?

376. A's money is to B's as 3 to 4; $\frac{1}{2}$ of A's money placed at interest for 3 yr. 8 mo. 15 da., at 6 per cent., will amount to $418.095. How much money has each?

377. Sold wheat at 1.64\frac{12}{17}$ per bushel, and gained 12%. For what should it have been sold to have lost 15%?

378. What is the cost of a 90 days' bill on Philadelphia, to the amount of $1,000, at $\frac{5}{8}$% premium, and interest off at 6%?

379. A man took out a life policy for $3,000, at the rate of $21.50 per $1,000. What sum must he deposit in a savings bank, the compound interest of which, at 5%, payable *semi-annually,* shall discharge his annual premium?

380. A merchant bought 500 barrels of flour at $6.50 a barrel, and sold it immediately at $7.25 a barrel, receiving in payment a note due three months hence, which he had discounted at a bank at 6%. What did he gain on the flour?

381. If a staff 2 ft. 9 in. long, cast a shadow 1 ft. 1½ in., what is the height of a pole which casts a shadow 63 ft.?

382. Bought a quantity of goods for $2,500 cash, and sold them for $3,125 on 3 months' credit. What did I gain, money being worth 9%?

383. The interest of a certain sum for 1 mo. 19 da. at 13½ per cent. is $.866. What is the principal?

384. The Illinois Central Railroad sold in one month 26,780 acres of land at an average price of $10.95 per acre, and an average credit of 3 yr. 6 mo. What was the cash value of the sales, money being worth 6%?

385. If a garden of a certain length and 4 rd. 8 ft. 3 in. wide contain $\frac{7}{8}$ of an acre, how much would it contain if it were 9 rods wide?

386. When is the balance of the following account due, per average?

Samuel M. Perkins.

Dr. *Cr.*

1877.		$	cts.	1877.		$	cts.
Jan. 21	To Mdse.	64	00	Jan. 1	By Cash	184	00
Mar. 5	" "	245	00	Feb. 4	" "	140	00
" 22	" "	294	00	Mar. 30	" "	12	00

387. A owed $2,520, due July 18, 1870; he paid $720 before, and the rest after it became due. When were the payments made if they were 49 days apart?

388. If $500 is deposited for a child at birth, at 7% compound interest, payable semi-annually, what will it amount to when the child is 21 years of age?

389. Bought fish at $6.37½ per quintal, and sold the same at $7.39½. What was the gain per cent.?

390. Bought a horse for $110; for how much must he be sold to gain 37½%?

391. J. S. Sanborn purchased 80 acres of land of the Illinois Central Railroad Company, on the following terms: Cash payment, $48; payment at the end of the first, second, and third years, $48 each; payment at the end of the fourth year, $236; at the end of the fifth year, $224; at the end of the sixth year, $212; and at the end of the seventh year, $200. What was the cash price per acre?

392. Bought a watch for $60, and sold it for $100. What per cent. of the cost was the gain?

393. If 3 pounds of tobacco cost $.84, and 5 pounds of tobacco are worth 10½ pounds of sugar, what will 90 pounds of sugar cost?

394. In how many years is a day gained by the Gregorian Calendar, which allows for the fraction of a day by adding 97 days in 400 years?

395. How many shares of $50 each must be bought at 25% discount, brokerage 1⅔%, and sold at 16% discount, brokerage 1¼%, to gain $121.66⅔?

396. A and B are partners; A's stock is to B's as 5 to 8; after 4 months A withdraws ⅖ of his, and B ¾ of his. How shall the year's gain, $920, be divided?

397. What must be paid in Boston for a draft on New York at 30 days, for $4,500, exchange being at ½% premium?

398. The cost of producing fine salt at the Onondaga Salt Works, is $11\frac{1}{2}$ cents per bushel, and coarse salt 5 cents; in 1862, 1,884,697 bushels of coarse, and 5,315,694 bushels of fine salt were produced, and sold at an average price of 19 cents per bushel. What was the per cent. of profit?

399. A bank has $20,000 loaned on call at 5%; how much is the daily interest, reckoning 365 days in a year?

400. At what rate must a note, payable in one year, without grace, be discounted to produce 6% interest?

401. The factors of a certain number are $16\frac{1}{8}$, $30\frac{2}{7}$, and $19\frac{4}{5}$; what is $\frac{3}{5}$ of $\frac{5}{7}$ of $\frac{7}{9}$ of the number?

402. A man engaged in business with a capital of $25,000 is making $10\frac{1}{2}$ per cent. per annum on his capital; but on account of failing health he is obliged to quit business, and loan his money at 7 per cent. How much does he lose in 2 yr. 7 mo. 20 da.?

403. If one cubic foot of anthracite coal weighs 56 lb., what must be the length of a bin 8 ft. wide and 6 ft. deep, to hold 14 long tons of coal?

404. In what time will $4,500 gain $181.25 at 5 per cent.?

405. A merchant bought goods in St. Louis to the amount of $850, and gave his note, July 1, 1869, on interest after 2 months; 4 months after the note was given, he paid $400, and 6 months after the first payment, he paid $360. What was there due Sept. 19, 1871?

406. A and B can do a work in $10\frac{10}{11}$ days; B and C in $13\frac{1}{3}$ days; and A and C in 12 days. In what time would each do the work alone? and how long would it take them working all together, to do it?

407. A and B invested equal sums in trade; A lost 20% of his money, and B gained $50.05; A's money was then 75% of B's. What sum did each invest?

408. The net proceeds of a shipment of hay, sold at $14 per ton, after deducting a commission of 3%, and $500 for other charges, were $6,290. How many tons of hay were shipped?

409. If the price of a farm of 160 A. 100 P. be $7,850.25, what will be the price of another farm, containing 120 A. 30 P., if 3 acres of the latter be worth 4 of the former?

410. A man bought 840 bushels of oats in New York at $.35 per bushel, and sold them in Connecticut for $349.44. The transactions being made by weight, how much advance upon the cost was the selling price per bushel?

411. A gentleman traveling east from Lawrence, Kansas, in 95° 10′ W. Long., found, on arriving at Boston, that his watch, an excellent time-keeper, was 1 h. 36 min. 28 sec. slower than the time at Boston. What is the longitude of Boston?

412. Bonds at 25% premium, brokerage $\frac{4}{5}$%, cost $527.93 more than the face; what is the face?

413. B. F. Sears bought a house and lot, Apr. 1, 1871, for which he agreed to pay $2,500 on the 16th of the following Nov., and $1,800 Apr. 1, 1872. If he could have got a discount of 9% for present payment, how much would he have gained by borrowing the sum at 7%, and how much would he have borrowed?

414. If a cistern 19½ feet long, 10½ feet wide, and 12 ft. deep, hold 546 barrels, how many barrels will a cistern *contain that is 18 ft.* long, 9 ft. wide, and 15 ft. deep?

415. Three men engaged in the lumber trade; A furnished $4,000, and B $6,000; they gained $1,680, of which C's share was $840. Required C's stock, and A's and B's gain.

416. A factor receives $30,056, and is directed to purchase cotton at $289 per bale; he is to receive 4% commission. How many bales does he buy?

417. Twenty-five workmen have agreed to labor 12 hours a day for 24 days, to pay an advance made to them of $900, but having lost each an hour per day, five of them engage to fulfil the agreement by working 12 days. How many hours per day must these labor?

418. Says B to C: "$\frac{1}{3}$ of my money is equal to $\frac{2}{5}$ of yours, and the difference between your money and mine is $10." What sum had each?

419. What is the amount of $872.50 for 3 yr. 6 mo. 18 da., at $7\frac{1}{2}$%?

420. Four men hire a pasture of 125 A. 48 P. at $1.75 per acre; A puts in 125, B 150, C 200, and D 225 sheep. How much rent ought each to pay?

421. A house that rents for $848.25 cost $8,700. What % does it pay on the investment?

422. When shall a note be made payable to balance the following account?

WILLIAM N. CRANE.

Dr. *Cr.*

1875.			$	cts	1875.			$	cts.
April	1	To Mdse. on 3 mo.	530	84	July	3	By Cash,	436	00
"	9	" " " "	236	48	"	14	" "	320	00
"	19	" " " "	739	56	"	22	" "	560	00
"	24	" " " "	273	44	Aug.	5	" "	370	00
May	4	" " " "	194	78	Sept.	4	" "	840	00
"	17	" " " "	536	42	"	12	" "	560	00

423. A and B having the same income, A spends $\frac{5}{6}$ of his; and B, by spending $200 a year more than A, finds himself at the end of 5 years $450 in debt. How much was their income?

424. Gave 533.33\frac{1}{3}$ of notes at 4% discount for $500 gold. What rate of premium was the gold?

425. A and B made a joint stock of $1,666, and gained $204, of which B had $60 more than A. How much did each contribute to the stock?

426. A grocer bought 11 bushels of chestnuts at $3.00 a bushel, and retailed them at 3 cents a half pint. What % profit was his gain?

427. A and B together can build a wall in 20 days; with the help of C they can do it in 12 days; in what time would C do it alone?

428. A merchant bought a quantity of butter at $24 per cwt. cash. For how much per pound must he sell it to gain 15%, and allow 8% discount for cash?

429. If the use of $6,919.32 for 7 yr. 6 mo. is worth $3,113.694, what sum is that whose use for 10 yr. 10 mo. 20 da. is worth $3,266.66$\frac{2}{3}$?

430. Forty per cent. of brandy is alcohol. How much alcohol does a man drink in 52 years, if he take $\frac{3}{4}$ of a gill of brandy 3 times a day?

431. A speculator gained 25% on $\frac{4}{5}$ of his investment, and lost 5% on the remainder; his net profits were $1,140. Had he gained 25% on $\frac{3}{5}$, and lost 5% on the remainder, what would have been his net profits?

432. Invested $3,432 in Government bonds at 106%, paying 1$\frac{1}{4}$% brokerage, and afterward sold the stock at 12% *premium, brokerage 1$\frac{1}{2}$%.* What was my gain?

433. A lady bought 23 yards of sheeting and 57½ yards of calico; she paid 2⅛ cents more per yard for the sheeting than for the calico, and the entire cost of the calico was twice as much as the sheeting. What was the price of each per yard?

434. At $11.75 per cwt., how much sugar can be bought for $90.25?

435. If it require 2,250 bricks, 8 in. long by 4 in. wide, to pave a court 25 ft. by 20 ft., how many tiles, 10 in. long by 5 in. wide, will be required to pave a walk 300 ft. by 8 ft.?

436. My salary is $800 a year. If I pay 25% for board, 10% of the remainder for rent, 20% of the residue for clothes, $32 for books, and loan ½ the remainder, what % of my salary is unexpended?

437. What per cent. of an acre is 100 P.?

438. A merchant bought a quantity of flour at $8.00 per barrel on a credit of 3 months, and kept it 6 months; then sold it on 3 months' credit, and gained 5%. Money being worth 6%, for how much did he sell the flour per barrel?

439. 1 qt. 1¾ pt. is what per cent. of 2 gal. 3¼ qt.?

440. I own $12,500 in a Mutual Insurance Company. How many shares shall I possess after a dividend of 8% has been declared, payable in stock?

441. What is the value of 40 casks of sugar, each weighing 12 cwt. 80 lb., draft 5%, tare 10%, at $8.75 per cwt. net?

442. At what rate of discount must the Illinois State 6% bonds be purchased that the person investing may receive 6⅔% upon his money?

443. The longitude of Paris is 2° 20′ 22″ E., and of Constantinople, 8° 59′ E. When it is 1 A.M. at the latter place, what time is it at the former?

444. If \$$37.70\frac{5}{16}$ will purchase $7\frac{15}{16}$ yd. of cloth, what is the price per yard?

445. What will be the duty at $4\frac{1}{2}$% on a case of jewelry and watches amounting to \$2,780?

446. A merchant bought 16 barrels of salt at \$$1\frac{1}{4}$ per barrel, and put it into sacks of 10 and 25 lb., each an equal number, selling them for \$.08 and \$.20 each. What % was his profit?

447. Sold $\frac{1}{2}$ of a lot of lumber for what $\frac{5}{8}$ of it cost; what % was gained on the part sold?

448. If a horse trot 2 miles in 5 min. 55 sec., how far would he trot in an hour at the same rate?

449. A ship has a leak that will fill and sink her in 24 hours; all her pumps are capable of emptying her in 25 hours. If the pumps are worked after the vessel has been leaking 3 hours, how long before the ship will sink?

450. How much wine can be bought for \$1.82, when a hogshead of 63 gal. is worth \$70.56?

451. How much gold at $68\frac{5}{8}$% premium can be bought for \$5,396 currency?

452. Three shafts together make 465 revolutions in a minute; the first makes a certain number, the second 3 times as many, and 10 more, and the third 15 less than twice as many as the second. How many revolutions does each make?

453. What must be paid in Philadelphia for a draft on St. Louis, drawn at 90 days, for \$5,000, at a premium *of $1\frac{3}{4}$%?*

454. A farmer sold at one time 35 bushels of corn and 60 bushels of wheat for $157.50; at another time 56 bushels of corn and 42 bushels of wheat for the same sum of money. What was the price of each per bushel?

455. A hired a house for one year for $500; at the end of three months he takes in H; and after 3 months more, M; and at the end of 9 months, K. At the end of the year, how much rent must each pay?

456. A merchant marked a piece of goods 25% above the cost, but its season passing, he determined to sell it 20% below the marked price, supposing he should make 5%. Did he make or lose?

457. What is 20% of 30% of 50% of $66.66⅔?

458. If the net earnings of a bank with $250,000 capital are enough to pay an annual dividend of 10%, and reserve a surplus of $2,500, also to pay 8⅓% of its net earnings to the State instead of taxes, what is the rate of taxation on its capital?

459. A town, 6 miles square, is divided into 325 equal farms. What must A. G. Dickey pay for one of these farms at $21.25 per acre?

460. If $1,500 in 7 mo. 20 da. produce $95.833, what principal must be loaned to gain $58 in 10 mo. 26 da.?

461. M and N enter into a partnership for 2 years; M puts in $8,000, and N $2,500; N is to do the business, and his services are regarded as worth the use of $5,500; after 6 months M increases his stock to $12,000; at the end of 2 years the partnership is closed, and there is a net gain of $4,750. Required each partner's share of the gain.

462. When $2.60 are paid for 8 gal. 1 pt. of milk, what is the price per quart?

480. A man has a piece of land $95\frac{5}{6}$ rods long and $58\frac{1}{3}$ rods wide, which he wishes to lay out in the largest possible square lots of equal size. How many lots will there be?

481. How many eagles, each containing 9 pwt. 16.2 gr. of pure gold can I get for 2,278.269 oz. pure gold at the mint, allowing $1\frac{1}{2}\%$ for coining expenses?

482. A owes B $500, payable in 4 months; at the close of 2 months he wishes to make such a payment as will extend the time of the balance to one year. What must be the payment?

483. A owes $1,500, of which $400 is to be paid in 4 months, $500 in 5 months, and $600 in 6 months. If he pays the whole at once, at what time must he make the payment?

484. What is the duty, at 25%, on 27 tons 8 cwt. 95 lb. of iron, invoiced at $48 per ton?

485. A, M, and S form a partnership, with capitals of $5,000, $10,000, and $15,000, respectively; A draws out $500 at the end of each year, M $800, and S $900; at the end of 5 years their joint capital is $28,600. How much of it does each own?

486. If 6 A. 123 P. of land are worth £65 4s. 9d., what is the value of 47 A. 61 P., U. S. money, sterling money being at $4.90 to the pound?

487. James Fitch owes three notes to George Holmes; one of $200, due in 8 months; another of $200, due in 16 months; and the third of $400, due in 2 years. Should the three notes be converted into two notes of equal amount, one to run one-half as long as the other, when *ought they to be made* payable?

488. An agent received $65 for collecting a debt of $1,300. What was the rate of his commission?

489. A merchant in Cincinnati wishes to remit $14,331.60 to New York. Exchange on New York is $\frac{3}{4}$% premium, but on St. Louis $\frac{1}{2}$% premium, from St. Louis to New Orleans $\frac{1}{2}$% discount, and from New Orleans to New York 1% discount. What will be the value in New York by each method, and how much better is the circular?

490. A's gain was $840, B's $1,125, C's $1,820; A's capital was in trade 7 months, B's 9 months, and C's 1 yr. 2 months. How much of the capital, $13,875, did each own?

491. 5 lb. is what per cent. of $\frac{2}{5}$ of a cwt.?

492. The sales of a clothing house amount to $100,000 a year; $\frac{1}{4}$ of the sales are made at a profit of 25%, $\frac{9}{20}$ at a profit of 20%, and the remainder at a loss of 4%. Required the cost of the goods.

493. A man 33 years old takes out a policy for $2,000, the payments to cease at 50, the annual premium being $3.50 per $100. If he survive that age, how much more money will he receive from the company than he pays them?

494. A man obtained an insurance for life at the age of 37, and died when 51 years old. The policy required annual payments during life, at $2.8674 per $100, and secured to the heirs $1,709.69 more than the amount of all the premiums paid. What was the face of the policy?

495. If it require 50,000 bricks to build a house whose walls are 1 ft. 6 in. thick, 20 ft. high, and 108 ft. long, how many will build one whose walls are 2 ft. thick, 30 ft. high, and 324 ft. long?

496. If I gain $46.27 on $578.37½ worth of sugar, how many dollars' worth must I sell to gain $134.64?

497. $3,250. RICHMOND, March 6, 1870.

On demand we promise to pay Brown & Gross, or order, three thousand two hundred and fifty dollars, for value received. CHURCH & BROTHERS.

Indorsed as follows: July 1, 1870, $406.87½; Nov. 7, 1870, $50; Jan. 1, 1871, $285; Aug. 10, 1871, $400.62; July 1, 1872, $125; Nov. 4, 1873, $544.60; Apr. 22, 1874, $473.76; July 1, 1874, $600. What was due Apr. 1, 1875?

498. A grocer bought 760 lb. of Java coffee, at 26 cents per pound. Allowing 16% for shrinkage in roasting and grinding, at what price per pound must he sell it to gain 25%?

499. Paid $5,392.35 in New York for a 30 days' draft on Boston, exchange being at ½% premium. Required the face of the draft.

500. Smith & Boise traded in company with a joint stock of $8,400. Smith's money was invested 14 months, and Boise's 10 months. The profits being equally divided, how much of the capital did each furnish?

501. A man with the proceeds of a note for $4,164.22 on 60 days, discounted at 6%, purchased flour at $10.25 per barrel, allowing ½% commission to a factor for buying it. At the end of 1 month he sold the flour on 90 days' credit for $11.50 per barrel; when his note at the bank matured, he had the note received for the flour discounted, and paid his own note. How much did he gain by the transaction?

502. If 4 gal. 1 qt. 1 pt. of oil is bought for $1.225, what is the price per gallon?

503. Two boys, each 12 years old, have certain sums of money left to them; the sum left to one is put out at 7% simple interest, the sum left the other at 6% compound interest, compounded semi-annually, and the amount of each boy's money will be $2,000 when he is 21 years old. What is the sum left to each boy?

504. A farmer had a dairy of 48 cows, each furnishing 18 qt. of milk a day, from which he made 40 cheeses of 60 lb. each in 30 days. He made a contract to deliver 100 cheeses of 96 pounds each in 80 days. How many cows must he add to his dairy provided each additional cow furnish 4 gallons of milk daily?

505. What sum must I invest in N. Y. and N. H. R. R. 6% bonds, at 101⅛, brokerage ¼%, to secure an income of $3000 a year?

506. When exchange at New York on Paris is 5 francs 25 centimes per $1, and at Paris on Hamburg 2¼ francs per marc banco, what will be the arbitrated price in New York of 6,580 mark bancos?

507. What is the distance around a rectangular field, whose length is twice its breadth, if one end measures 35 rd. 5 yd. 2 ft. 6 in.?

508. How many bushels of corn in Illinois are equal to 3,000 bushels in New York?

509. What is the value of a house and lot that pays a profit of 9 per cent. by renting it at $50 a month?

510. A draft was purchased in New York on Chicago for $3,000, drawn at 60 days, for $2,850. What was the course of exchange?

511. A grocer sold 12 hams, each weighing 15 lb., at 12½ cents per pound, and took in payment 1 load of apples, consisting of 18 bags, each containing 2½ bushels. Required the price of the apples per bushel?

512. A merchant in New York wishes to pay £3,000 in London. Exchange on London is at par; on Paris, 5 francs 25 centimes per $1; and on Amsterdam, 40 cents to a guilder. The exchange between France and England at the same time is 25 francs to £1, and that of Amsterdam on England 12⅛ guilders to £1. Which is the most advantageous, the direct exchange, or through Paris, or through Amsterdam?

513. Received from Charleston 500 bales of cotton, each weighing 560 lb., invoiced at 14⅛ cents per lb.; sold it at an advance of 20%, commission 1⅛%, and remitted the net proceeds by draft. What was the face of the draft, exchange being 1½% discount?

514. What sum must be invested in United States 10-40's, bearing 5% interest, payable in gold, purchased at par, to produce a semi-annual income of $400 U. S. currency, when gold is quoted at 175%?

515. How many bushels of oats in Connecticut are equal to 5,000 bushels in Iowa?

516. If the interest of $691.04 for 1 mo. 3 da. is $3.167, what will be the interest of $640.50 for 10 mo. 26 da., at twice the rate?

517. A father left his four sons, whose ages are 15, 11, 7 and 6 years, $57,770, to be so divided that the respective parts placed at simple interest in Mississippi shall amount to equal sums when they become 21 years of age. What are these parts?

CHAPTER VI.

THE examples contained in this chapter cover nearly or quite all the subjects in ordinary text-books on Arithmetic, and include such as are not contained in the preceding pages.

MENTAL EXERCISES.

1. What is the square of 2? of 3? 4? 5? 6? 7? 8? 9? 10? 11? 12?

2. What is the cube of 2? of 3? 4? 5? 6?

3. What is the second power of $\frac{1}{2}$? $\frac{2}{3}$? $\frac{3}{4}$? $\frac{7}{8}$? $\frac{9}{10}$?

4. What is the fourth power of 2? of 3? of $\frac{1}{2}$? of $\frac{2}{3}$?

5. What is the third power of $\frac{1}{3}$? of $\frac{3}{4}$? $1\frac{1}{2}$? .5?

6. How many square feet in a level surface that is 9 feet on each side?

7. How many square yards in the floor of a room that is 12 feet square?

8. How many solid feet in a cubic yard of earth?

9. A cubical block of stone is 4 ft. on each edge; how many solid feet does it contain?

10. What is the value of 9^2? 3^4? 6^3? $(\frac{9}{10})^2$? $(2\frac{1}{2})^3$? 3^5?

11. Find the value of $.02^2$; $.3^4$; 1.2^2; $(\frac{3}{5})^3$.

12. What are two equal factors of 9? 16? 36? 64?

13. How many acres in a field 25 rods long and 20 rods wide?

14. How many cubic feet of earth will a wagon-box hold that is 7 ft. long, 3 ft. wide, and 2 ft. 4 in. high?

15. How many yards of carpeting 1 yd. wide will cover the floor of a hall 18 ft. long and $5\frac{1}{2}$ ft. wide?

16. Of what number is 64 the second power or square?

17. Of what number is 64 the third power or cube?

18. What integers between 1 and 100 are perfect squares?

19. What are the three equal factors of 27? of 64? of 125?

20. What integers between 1 and 1000 are perfect cubes?

21. What are the four equal factors of 16? of 81?

22. What is the square root of 36? of 49? of 64?

23. What is the cube root of 8? of 27? of 125?

24. What is the fourth root of 16? of 81? of 256?

25. What is the length of the edge of a cubical box whose capacity is 216 cubic feet?

26. Two men bought 48 bushels of apples; one paid $7, and the other $5; how many bushels should each have?

27. A and B can dig a well in 6 days, A and C in 8 days, and B and C in 9 days; in how many days can each dig it?

28. Six times a number is 15 greater than 3 times the same number; what is the number?

29. What is the square root of $\frac{25}{36}$? of $\frac{9}{4}$? of 1.44?

30. How many square feet in a board 12 ft. long and 18 in. wide?

31. How many square feet in a board 16 ft. long and 1 ft. 3 in. wide?

32. Three boys have 84 marbles; the second has 4 more than the first, and the third 10 more than the second; how many has each?

33. I sold a horse for $\frac{3}{4}$ of $1\frac{3}{5}$ times the cost; what was the gain per cent.?

34. What is the value of a stick of timber 20 ft. long and 6 in. by 4 in., at 3 cents a foot board measure?

35. How many feet in 2 planks, each 2 in. thick, 12 ft. long, and 15 in. wide?

36. What is the value of $\sqrt{81}$? of $\sqrt{121}$? of $\sqrt[3]{216}$?

37. What is the value of $\sqrt[4]{81}$? $\sqrt{3 \times 12}$? $\sqrt[3]{\frac{64}{125}}$?

38. Find the value of $\sqrt{9 + 16}$; $\sqrt[3]{2 \times 2 \times 16}$; $\sqrt{\frac{15}{49} + \frac{3}{7}}$

39. Find the value of $\sqrt[3]{\frac{11}{27} - \frac{1}{9}}$; $\sqrt{1.8 - .36}$; $\sqrt[4]{\frac{7}{81} + \frac{1}{9}}$.

40. Divide 44 cents between 2 boys, so that $\frac{1}{2}$ of the number one receives shall equal $\frac{3}{5}$ of the other.

41. Three men can do a piece of work in 10 days; A does $\frac{3}{4}$ as much as B, C does $\frac{2}{5}$ as much as A and B; in how many days will each do it?

42. In how many days will A and B do it?

43. In how many days will A and C do it?

44. In how many days will B and C do it?

45. A cow purchased in the spring for $56 was sold in autumn for $42; what was the loss per cent.?

46. If 3 lb. of sugar at 5 cents, 4 lb. at 7 cents, and 3 lb. at 10 cents, be mixed together, what is 1 lb. of the mixture worth?

47. What is the distance between opposite corners of a garden, the sides of which are 4 rods and 3 rods respectively?

48. Two men trade in company, one furnishing $40 for 10 days, the other $60 for 20 days; they lose $44; what part of the loss must each bear?

49. If $\frac{2}{3}$ of the time past midnight, plus $1\frac{1}{15}$ hours, equals $\frac{2}{5}$ of the time to midnight, what is the time?

50. James saves $6 while Harry saves $9; how much will each have when the difference between what each has saved is $45?

51. When tea is sold for 8 shillings a pound that cost $6\frac{1}{2}$ shillings, what per cent. is gained?

52. A grocer divided a cheese that weighed 60 lb. into two such parts that one weighed $\frac{5}{7}$ as much as the other; the smaller piece he sold at 8 cts. a pound, the larger for $12\frac{1}{2}\%$ a pound more. How much did he receive for the whole cheese?

53. What part of a given principal will equal the interest, if loaned at 4% for 8 yr. 6 mo. 15 da.?

54. A man engaged to work 20 days on condition that he should receive $3 for every day's labor, and forfeit $\$1\frac{1}{2}$ for every day he was idle. He received at settlement $33; how many days was he idle?

55. How much wheat must be taken to mill that 12 bushels may be retained after giving toll of 10% for grinding?

56. John's money is to Henry's as 2 to 3; if $\frac{1}{2}$ of John's money is put at interest for 3 years 9 months, at 10%, it will amount to $550. How much money has each?

57. Had I paid 6% less for a farm I purchased, it would have made a difference of $120 in the purchase-money; what did the farm cost me?

58. A man paid $25.20 for 60 bushels of apples, giving $.50 a bushel for good ones, and $.30 for poor ones; how many bushels were there of each?

59. Two numbers are to each other as 3 to 7, and $\frac{1}{2}$ their difference equals $\frac{1}{9}$ of a third number; the sum of all three numbers is 56; what are the numbers?

60. B's fortune is $1\frac{1}{2}$ times A's; the interest of $\frac{1}{2}$ of A's fortune, and $\frac{1}{3}$ of B's for 5 years, at 6%, is $600. What is the fortune of each?

WRITTEN EXAMPLES.

1. It is 80 rods between the opposite corners of a square field. How many acres in the field?

2. A grocer mixed 5 lbs. of sugar, at $8\frac{3}{4}$ cts. per pound, with 80 lbs., at $7\frac{3}{4}$ cts. per pound, and 60 lbs. at such a price that the mixture was worth $9\frac{3}{4}$ cts. per pound. Required the price per pound of the last kind of sugar.

3. Two mechanics work together; for 10 days' work of the first and 8 days' work of the second they receive $50; and for 15 days' work of the first and 14 days' work of the second they received $81. What is each man's daily wages?

4. If $600 gain $72 in 1 yr. 6 mo., in what time will $850 gain 189.83\frac{1}{3}$?

5. The Winchester bushel is of cylindrical form, 18.5 in. in diameter, and 8 in. deep. What must be the dimensions of a cubical box which shall contain 27 bushels?

6. The longitude of Springfield, Mass., is 72° 35′ 45″ W., and of Constantinople, 28° 49′ E. When it is 9 o'clock A.M. at the latter place, what time is it at the former?

7. A note was given for $500, with interest payable annually, at 7%. Nothing having been paid for 10 years, how much did the total amount of interest due exceed the simple interest of the principal?

8. A rectangular piece of land, containing 8 A. 72 sq. rd. is $\frac{1}{2}$ as wide as it is long. What is the distance around it?

9. A farmer took some butter to the store and received therefor $12.25, the price per pound being as many cents as there were pounds. How many pounds were there?

10. Four towers—A 125 feet high, B 25 yards high, C 160 feet high, and D 70 feet high—stand upon the same plane; B directly south, and 40 rods from A; C east from B; and D south from C. The distance from A to C plus the distance from C to B is $\frac{1}{2}$ a mile, and the distance from D to B is $82\frac{1}{2}$ yards farther than the distance from C to D. Required the length of a line to connect the tops of A and D.

11. A miller is required to grind 160 bushels of provender worth $1.00 a bushel, from oats worth $.40, corn worth $.80, barley worth $.90, and rye worth $1.10, and wheat worth $1.30 per bushel. How many bushels of each kind may he take?

12. What is the daily interest on $63,300 in U. S. demand notes, bearing $7\frac{3}{10}$% interest?

13. There is a park containing 15 A. 150 P., and the breadth is $\frac{3}{4}$ the length. If two men start from the same corner and travel at the rate of 4 miles per hour, one going around the park, and the other taking the diagonal, how much sooner will the latter reach the opposite corner than the former?

14. If I own $\frac{5}{9}$ of a farm, and sell $\frac{2}{3}$ of my share for $3,460, what part remains to me? and what is the whole farm worth?

15. G and H trade in company; G's capital is $\frac{3}{5}$ of H's: at the end of 5 months H draws out $\frac{1}{4}$ of his capital; and at the end of 9 months G draws out $\frac{1}{3}$ of his. What part of the gain, which is $4,222.50, should each have at the end of the year?

16. When a bill on Paris for 28,965 francs costs $7,183.72, what per cent. is the rate of exchange above par?

17. A and B traded together; A put in $400 for 512 days, and received $\frac{1}{3}$ of the gain; the number of dollars which B put in was equal to the number of days it was employed in trade. What was B's capital?

18. What is the sum of $\frac{.5 \times .006}{\frac{9}{15} \text{ of } \frac{4}{5} \times (\frac{1}{4})^2}$ and $\frac{\frac{1}{5} \text{ of } \frac{15}{16} \times (\frac{2}{3})^2}{1.6 \times .625}$?

19. How much less will it cost to fence 32 A. 64 P. in the form of a circle than in the form of a square? and how much less in a square form than in the form of a rectangle, whose length is 4 times its width, the price in each case being $1.50 per rod?

20. One-third of a quantity of goods was sold to gain a certain %, one-fourth to gain $1\frac{1}{2}$ times as much %, and the remainder to gain $2\frac{1}{2}$ times as much %. What is the gain % on each part, the gain upon the whole being 21%?

21. If a cask 45 inches long and 36 inches bung diameter, contain 167 gallons of wine, what must be the length and bung diameter of a cask of the same shape containing 314 gallons?

22. Wishing to ascertain the height of a tower, I erected near it a stick $2\frac{1}{2}$ feet high; by measurement I found the shadow of the tower to be $36\frac{3}{4}$ ft., and of the stick 9 in. at the same time. Required the height of the tower.

23. A man agreed to work for a blacksmith for $1.50 per day and his board; for each day lost he was to allow $.40. At the end of 11 weeks he received $77.15. How many days did he lose?

24. A person traveled from New York to Harrisburg in 12 days, walking 4 miles the first day, 6 miles the second, 8 miles the third, and so on. How far is Harrisburg from New York?

25. What is the difference between the interest and discount of $730, for 5 yr. 9 mo., at 8 per cent.?

26. When shall a draft for the settlement of the following account be made payable?

DAVID SCOTT.

Dr. *Cr.*

1876.		$	cts.	1876.		$	cts.
Jan. 1	To Mdse. on 3 mo.	54	36	April 1	By Cash,	50	00
Feb. 12	" " " 2 "	28	45	May 16	" Draft at 30 da.	80	00
Mar. 16	" Sundries	95	75	June 12	" "	125	00
June 25	" Mdse.	26	32	" 20	" Cash,	150	00

27. Three contractors engaged to build a piece of road for $8,775; A employed 20 hands 24 days, 10 hours a day; B, 25 hands 20 days, 12 hours a day; and C, 30 hands 25 days, 9 hours a day. How much should each contractor receive?

28. A ship sailed due south and due east on alternate days, at the same rate each day; at the end of six days it was found to be 203.646 miles south-east from the place of starting. What was the daily rate of sailing?

29. If a body put in motion move $\frac{1}{4}$ of an inch the first second, $\frac{1}{2}$ an inch the second, 1 inch the third, and so continue to increase its velocity in geometrical ratio, how far would it move in $\frac{2}{3}$ of a minute?

30. An importer sold cloth to a wholesale dealer at 10% advance; the wholesale dealer sold it to a clothier at $12\frac{1}{2}$% advance; the clothier sold it at a further advance of 25%, and received $1,452. How much did it cost the importer?

31. If it cost $85.60 to inclose a circular field containing 2 A. 28 P., how much will it cost to inclose another containing 26 A. 23 P.?

32. A church is 80 ft. long and 50 ft. wide, and the elevation of the roof is 14 ft.; the rafters extend 2 ft. beyond the plates, and the boarding projects 2 ft. at each end. How many feet of boards will be required to cover the roof, allowing $\frac{1}{4}$ for waste?

33. What is the balance of the following account, and when is it due?

JOHN D. EMACK.

Dr. *Cr.*

1874.		$	cts.	1874.		$	cts.
Mar. 1	To Sundries	436	00	Mar. 25	By Draft at 60 da.	400	00
April 12	" Mdse.	548	00	April 6	" " " 30 "	650	00
July 16	" "	312	00	June 20	" Cash,	200	00
Sept. 14	" "	536	00	Aug. 3	" "	84	00

34. How many sq. ft. in the surface of a cube whose solidity is 79,507 cu. ft.

35. A merchant in New York gave $\$1,000$ for a bill on London of £200. What was the rate of exchange?

36. A grocer desires to mix teas worth $\$1.50$ and $\$1.20$, with 140 pounds worth $\$.75$, that the mixture may be worth $\$1.00$. What quantities of each must he take?

37. The first term of a geometrical progression is 1, the last term 15,625, and the number of terms 7; find the common ratio?

38. An annual pension of $\$500$ is in arrears 10 years. What is the amount now due, allowing 6 per cent. compound interest?

39. A quantity of wheat was heaped up in a corner of a square room forming a portion of a cone, of which the perpendicular height was 4 ft. 3 in. and the slant height 7 ft. 1 in. What was its value at $\$1.66\frac{2}{3}$ a bushel?

40.

JONATHAN PIPER.

Dr. *Cr.*

1874.		$	cts.	1874.		$	cts.
Jan. 1	To Mdse.	36	72	Jan. 10	By Cash,	98	72
Feb. 1	" "	48	25	" 21	" "	25	84
Mar. 17	" "	72	86	Mar. 23	" Sundries,	15	17
April 1	" "	98	48	April 6	" "	8	96

If the above account were settled April 6, 1874, by draft on time, how many days' credit should be given?

41. Find the first and last terms of an arithmetical progression whose sum is 408, common difference 6, and number of terms 8.

42. $\frac{3}{5}$ of $\frac{10}{9}$ of what number, diminished by $\frac{\frac{1}{2} \text{ of } \frac{3}{10}}{2\frac{1}{6} + \frac{7}{30}}$, leaves $\frac{(4\frac{1}{3})^3 - 1}{(4\frac{1}{3})^2 - 1}$?

43. Find the square root of 1.06^5 correct to the sixth decimal place.

44. A, B, and C traded in company; A put in $1,400; B, $2,500; and C, 300 barrels of flour; they gained $2,300, of which C took $1,000. What were the shares of A and B, and what was the price of C's flour per barrel?

45. If from 68 and 82, respectively, a certain number be subtracted, $\frac{1}{7}$ of the first remainder will be equal to $\frac{1}{9}$ of the last. What is the number subtracted?

46. A plot of ground is 80 rods square. What is the breadth of a graveled walk around it, covering an area equal to $\frac{1}{8}$ the area of the field?

47. A gentleman bought an annuity of £500 in English consols, bearing 3% interest for 20 years. What was the present worth?

48. An orchard containing 6 A. 12 sq. rd. is 3 times as long as it is wide. Required the length and breadth.

49. A man left $10,000 to be divided between his three sons, whose ages were 10 yr., 13 yr. 4 mo., 17 yr. 6 mo., respectively, in such proportions that the share of each at simple interest at 6%, should amount to the same sum when they should arrive at the age of 21 years. What was each one's share?

50. A grocer sells a farmer 150 lb. of sugar at 14 cents a pound, and makes 5%; the farmer sells him 150 lb. of meat at 12 cents a pound, and makes a profit of 8%. Which gains the more by the trade, and how much?

51. A mechanic received $3 a day for his labor, and paid $5 a week for his board; at the end of 8 weeks he had saved $74. How many days did he work?

52. A bought a house of B, and gave him his bond for $6000, dated April 1, 1872, payable in 5 equal annual installments of $1200, the first to be paid April 1, 1873; A took up his bond April 1, 1875, semi-annual discount at the rate of 7% per annum on the payments due after April 1, 1875, being deducted. What sum canceled the bond?

53. Find the value of $1.0125^{\frac{3}{2}}$ correct to the fourth decimal place.

54. Find the value of $1.023375^{\frac{1}{2}}$ correct to the sixth decimal place.

55. An importer sold a quantity of goods to a wholesale merchant at an advance of 10%; the latter sold them to a retailer, gaining 12½%, and the retail merchant sold them for $3,093.75, gaining thereby 25%. How much did the goods cost the importer?

56. What is the hour when $\frac{2}{3}$ of the time past noon is $\frac{2}{5}$ of the time till midnight?

57. How many steres in a wall 24 metres long, eight and $\frac{5}{10}$ metres high, and 52 centimetres thick? And what would be the cost of building it, at $4.25 a stere?

58. A man held three notes, the first for $600, due July 7, 1873; the second for $530, due Oct. 4, 1873; and the third for $400, due Feb. 20, 1874; he made an equitable exchange of these with a speculator for two other notes, one of which was $730, due Nov. 15, 1873; what was the face of the other, and when due?

59. What must be the depth of a cubical cistern that will hold 200 bbl. of water?

60. A man at his death having a daughter in England and a son in California, willed that if the daughter returned, and not the son, his wife should have $\frac{2}{3}$ of his estate; but if the son returned, and not the daughter, she should have but $\frac{1}{3}$; but both returned, and the widow received in equity $2400 less than if only the daughter had returned. What should have been the wife's portion if only the son had returned?

61. A man bought a piece of property for $10500, and agreed to pay principal and interest in 3 equal annual installments. How much was the annual payment, interest being 7%?

62. There are three houses so situated that the lines connecting them form an equilateral triangle, the sides of which are 70 rods in length. How many acres are included in the triangle?

63. What sum must a man save annually, commencing at 21 years of age, to be worth $30,000 when he is 50 years old, his savings being invested at 5% compound interest?

64. What is the average of the following account?

1873.	Oct.	1.	Mdse., on 60 da.	$140
"	Nov.	12.	" " "	600
"	Dec.	25.	" " "	536
1874.	Jan.	16.	" " "	425
"	Feb.	24.	" " "	336
"	Mar.	17.	" " "	437

65. A bin of wheat measures M 7 square, and M 2.7 deep. How many hectoliters will it contain, and what will be the cost of the wheat at $2 per bushel?

66. Insert four arithmetical means between 2 and 79.

67. How many globes 2 in. in diameter are equal in volume to one 20 in. in diameter?

68. A merchant failing in business can pay 76 cents on a dollar. He offers to pay his whole indebtedness without interest in five years if his creditors will allow him to go on with his business; his offer being accepted, how much will his creditors lose in the five years, money being worth 7%?

69. What are the interior dimensions of a cubical box that contains 40 bushels of grain?

70. My garden is 11 rods $7\frac{1}{4}$ feet long, and 9 rods $15\frac{1}{12}$ feet wide. What is the length of the longest rails that can be used in fencing it, allowing the end of each rail to lap by the other 5 in., and all the panels to be of equal length? How many rails will fence the garden if 6 rails are allowed to each panel?

71. In an arithmetical series the common difference is $\frac{5}{9}$, and the extremes are $14\frac{8}{9}$ and 11; what is the number of terms?

72. A man 30 years of age takes a life policy in a Mutual Company for $5,000, the premiums continuing until death. The dividend reduces the annual premium an average of 30%. He dies after making 21 payments. How much more money will his family receive than he has paid to the company?

73. Simplify $\dfrac{\sqrt{1+\frac{1}{3}} \div \sqrt{1-\frac{1}{5}}}{\sqrt{1+\frac{1}{3}} \times \sqrt{1-\frac{1}{5}}}$.

74. A triangular orchard has 1 tree in the first row, 3 in the second, 5 in the third, and so on in arithmetical progression. How many trees in the orchard, there being 50 rows?

75. How many strokes of a common clock are struck in 24 hours?

76. A man wishes to inclose a circular field which shall contain $\frac{1}{24}$ as many acres as it will require rails to build a fence around it. The rails being 15 feet long, and the fence 6 rails high, how many acres must there be in the field?

77. J. Bagg & Co. becoming insolvent, their indebtedness was $11,666$\frac{2}{3}$; their assets were $9,012.50. What % of their indebtedness can they pay, allowing to the assignees 3% on the amount distributed to the creditors?

78. A man wishes to tether his horse to a stake, so that he may graze on $\frac{1}{4}$ of an acre. What must be the length of rope?

79. I wish to pay a bill in Naples of 7,500 lire; the direct exchange is $.22 = 1 lira; the exchange on London is $4.95; of London on Paris is £1 = 26 francs; of Paris on Naples is 1$\frac{1}{8}$ francs = 1 lira. What is the difference between the direct and circuitous exchange?

80. What is the difference between the true and bank discount of $3,000, payable in 120 days at 8½%?

81. A square pyramid of cannon-balls has 12 on each side at the base. How many balls in the pyramid?

82. How many pounds of sugar at 8, 13, and 14 cts. per pound, may be mixed with 3 pounds at 9¼ cts., 2 pounds at 8½ cts., and 4 pounds at 14 cts. a pound, so as to gain 16% by selling the mixture at 14½ cts. per pound?

83. I sell goods to A at different times, and for different terms of credit, as follows:

Feb. 10,	1875,	a bill on	30	days'	credit,	for	$180
Mar. 7,	"	"	30	"	"	"	300
April 16,	"	"	60	"	"	"	150
May 20,	"	"	90	"	"	"	350
June 25,	"	"	30	"	"	"	130
July 25,	"	"	30	"	"	"	140

If I take his note in settlement, at what time shall interest commence?

84. E, F, and G start from the same point and in the same direction to walk around a trotting-course 1 mile in circumference; E takes 60 steps, of 26 inches each, a minute; F, 90 steps, each 28 inches in length; and G, 120 steps, each 32 inches in length. What distance must each travel, and how long, before they will be together again at the point of starting?

85. A man 34 years old insures his life for $5000, at the rate of $2.5232 per $100; he dies at the age of 53. Allowing 6% compound interest on all premiums paid, how much has his policy actually cost?

86. A produce dealer bought 30000 bushels of corn at $1.55 per bushel, paying $450 charges, and $225 storage; he immediately sold it at 25% advance on the entire cost on 90 days' time. At what price per bushel did he sell the corn? and what % did he gain at the time of the sale, money being worth 7%?

87. A man paid annually $10 for tobacco from the age of 14 until he was 50, when he died, and left $1000 for his heirs. What sum might he have left them had he dispensed with tobacco, and loaned the money thus saved at the end of each year at 6% compound interest?

88. The diameter of the sun is 110 times as large as that of the earth. The volume of the sun is how many times as large as the volume of the earth?

89. What will be the cost of a pile of wood M 85 long, M 2 high, M 1.9 wide, at $2 per stere?

90. What is the compound interest of $1 for 143 years, allowing it double once in 11 yr. 11 mo.?

91. A servant being ordered to purchase 40 animals for $40, brought home calves at $4, lambs at $1.00, and kids at $.50 each. How many of each kind did he purchase?

92. If I borrow $1,000, and agree to pay 6% at the end of each year for the use of it, and at the end of 18 months it is called for, how much do I strictly owe?

93. If a cannon-ball 8 in. in diameter weigh 128 pounds, what is the diameter of a ball weighing 250 pounds?

94. I have sugars worth 12, 14, 16, and 18 cents a pound. How many pounds of each kind may I mix to make a barrel of 260 pounds, which I can sell at $.16½ per pound and gain 10%?

95. A and B gain in business $5,040, of which A is to have 10% more than B. Required the share of each?

96. What length of fence will inclose a circular field containing 10 acres?

97. An ox, whose girth is 8 ft., weighs 1,500 lb.; what is the girth of another ox that weighs 632 lb. 13 oz.?

98. A man pays $6 yearly for tobacco from the age of 16 until he is 60, when he dies, leaving to his heirs $500. What might he have left them if he had dispensed with this useless habit and loaned the money at the end of each year at 6% compound interest?

99. How many miles of furrow, 1 ft. 3 in. wide, must be turned in plowing a rectangular field whose width is 30 rods, and whose length is 10 rods less than its diagonal?

100. A captain, commanding a company of 100 men who had performed a daring exploit, being asked what reward could satisfy him, replied, "A cent for every different *file* of ten men that can be made with my company." What did his demand amount to?

101. If 2 cu. in. of iron weigh as much as 15 cu. in. of water, and a cubic foot of water weigh 1,000 ounces, find the weight of a cu. yd. of iron.

102. What is the present worth of an annuity of $500 for 7 years, at 6 per cent. compound interest?

103. A Chicago merchant shipped 1,000 barrels of flour to his agent in New Orleans, directing him to sell it and invest the proceeds in cotton; his agent sold the flour at $14 per bbl., paid $275 charges, and bought cotton at $.65 per pound, charging 3% commission for selling the flour and 5% for buying the cotton. How many pounds of cotton did he buy?

104. A young man inherited an estate of $40,000; after spending $\frac{1}{5}$ of it, he invested the remainder in an unsuccessful business, losing $33\frac{1}{3}$% of the investment; with his remaining money he purchased 5-20 United States bonds at par, bearing 6% interest, payable in gold. How much was his yearly income in currency, gold being 175%?

105. M and N are joint tenants of a house, paying $62.50 and $87.50, respectively, each quarter for rent. The landlord having raised the annual rent $100, what rent must each now pay quarterly?

106. How much less will the fencing of 20 acres cost in the square form than in the form of a rectangle, whose breadth is $\frac{1}{8}$ the length, the price being $2.25 per rod?

107. In how many different ways may the letters of the alphabet be arranged, taking 15 each time?

108. A merchant bought 200 bbl. of flour for $1,665, paying $9 per barrel for first quality, $8 for second, and $7.50 for third. How many barrels of each quality did he buy?

109. A merchant mixes 13 pounds of tea with 7 pounds of an inferior quality, and gains 20% by selling the mixture at 1.05\frac{3}{5}$ per pound. Allowing one kind of tea to be worth 20 cents a pound more than the other, what is the cost of each per pound?

110. A gentleman purchases a farm for $10,000, which he sells after a certain number of years for $14,071, making on his investment 5% compound interest. He now invests his money in a perpetuity, which is in reversion 11 years from the date of purchasing the farm. Allowing 6% compound interest for the use of money, find the annuity and *the length of time* he owns the farm.

111. A cistern 15 feet deep will hold 5,640.192 gallons. What is its diameter?

112. If a pipe 3 inches in diameter discharge 12 hogsheads of water in a certain time, what must be the diameter of a pipe which will discharge 48 hogsheads in the same time?

113. The horizontal distance between the eaves of a certain building is 40 ft.; the elevation of the ridge above the eaves is 15 ft. What is the length of the rafters?

114. How many thousand shingles, averaging 4 in. wide, and lying 6 inches to the weather, are required to cover both sides of a roof 36 ft. long, whose rafters are 20 feet in length?

115. A's money was to B's as 2 to 3; when A had spent $40, and B had spent 40% more than A, A's money, minus $20, was to B's money, plus $2, as 4 to 9. How much had each at first?

116. Having placed a bill of $775 in the hands of a collector, who succeeded in obtaining 75% of it, and charged 8% commission, how much did I receive?

117. A merchant insures a ship and cargo for $79,325, at $4\frac{3}{8}\%$, the policy covering both property and premium. What is the value of the ship and cargo?

118. A B, and C formed a partnership for 2 years; A put in $10,000, B $5,000, and C $2,500; it was agreed that C should receive $1,500 a year for superintending the business. A drew out $1,000 at the end of each quarter for one year, and at the end of 13 months put in $15,000 more; B withdrew $600 at the end of each quarter. At the time of settlement the net gain, after paying his salary, was $22,500. Required each one's share.

119. A gentleman wishes to set out a rectangular orchard of 1,260 trees, so placed that the number of rows shall be to the number of trees in a row as 5 to 7. If the trees are 8 yards apart, how much ground will the orchard occupy?

120. I have a circular field 600 rods in circumference. What must be the side of a square field that shall contain the same area?

121. A's age is double that of B, and B is three times as old as C, and the sum of their ages is 70. What is the age of each one?

122. Simplify $\left[2\frac{3}{4} + \left(\frac{5}{2} \text{ of } \frac{7}{3\frac{4}{5}}\right) - \frac{1\frac{2}{3}}{2\frac{1}{2}}\right] \div 1\frac{77}{228}$.

123. A man in Cleveland purchased a draft on St. Louis, Missouri, for $10,640, drawn at 60 days, paying $10,283.56. What was the course of exchange?

124. A gentleman from Boston being in England, exchanged $158\frac{1}{4}$ lb. of silver for gold, giving $15\frac{1}{14}$ lb. of silver for 1 lb. of gold; in Boston, he exchanged his gold for silver, receiving $15\frac{15}{31}$ lb. of silver for 1 lb. of gold; how much silver did he gain by the exchanges?

125. In a pair of scales a body weighed 32 pounds in one scale, and only $24\frac{1}{2}$ pounds in the other. What was its true weight?

126. Suppose a number of stones were laid a rod apart for 30 miles, the first stone by the side of a basket. What distance will a man travel who gathers them up one by one, returning with each one to the basket?

127. What sum of money, with its semi-annual dividends of 4% invested with it, will amount to $25,000 in 3 years?

128. A merchant bought, on 10 mo. credit, 25 pieces of cloth, each containing 30 yards, at \$4.66$\frac{2}{3}$ per yard; after keeping the goods 3 mo. he sold them at \$5 per yard on a credit of 9 mo.; money being worth 6%, what was his net cash gain at the time of the sale?

129. An irregular piece of land containing 305 A. 41 P., was exchanged for a square piece containing the same area. What was the length of one of its sides? If divided into 169 square building-lots, what will be the length of a side of each?

130. If a stone 20 inches long, 15 inches broad, and 8 inches thick, weigh 217 pounds, what will be the length, breadth, and thickness of a similar stone that weighs 13,888 pounds?

131. A wine dealer desires to mix 20 gallons of wine, worth \$3.50 per gal., with wines worth \$3.25 and \$1.80 per gal., so as to form a mixture of 96 gallons, worth \$3.00 a gallon. How much of each kind may he take?

132. At a certain time between one and two o'clock the minute-hand is between 2 and 3, and within an hour the hands will exactly change places. What is the first mentioned time.

133. When gold is quoted at 162%, what is the value in gold of a U. S. note of the denomination of \$10?

134. Bought wheat at \$1.75, \$1.80, and \$2.00 per bushel. In what proportion may they be mixed so as to sell the mixture at \$2.15$\frac{1}{4}$ per bushel, on 3 mo. credit, when money is worth 10%, and make a present gain of 12%?

135. A walk 9 ft. wide surrounds a square garden; the area of the walk being $\frac{1}{4}$ of an acre, what is a side of the inclosed square?

136. M began business with $1,000; four months after, S entered into partnership with him, and put in 6 houses, each of the same value; at the close of the year their profits were $3,000, of which S's share was $2,000. What were his houses each valued at?

137. A grocer mixed 4 pounds of tea at $1.20 with 3 pounds at $1.40, 1 pound at $2.20, and 2 pounds at $2.40. What per cent. profit will he make by selling the mixture at $2.00 per pound?

138. A man purchased a farm for $3,000, and agreed to pay principal and interest in 4 equal annual installments. What was the annual payment, interest being 6%?

139. What is the distance from one corner of a cubical block to the opposite diagonal corner, the side of the cube being 5 feet?

140. A and B traded in company. A put in $845 for 300 days, and received $\frac{3}{8}$ of the gain. The number of dollars which B put in was equal to the number of days it was employed in trade. What was B's capital?

141. Insert 5 arithmetical means between 2 and 4.

142. If a stack of hay 8 ft. in height weigh 8 cwt., what is the weight of a similar stack that is 24 ft. in height?

143. Allowing 5% of the hay in the stack last mentioned to be worthless, what is the value of the remainder at $14 per ton?

144. If I rent a house which cost $9,000, for $900 a year, and lay out $150 in repairs, what % interest do I receive?

145. A man engaged a boy at the rate of $.25 for the first day, $.30 for the second, $.35 for the third, and so on, increasing his wages 5 cents per day. How many days must the boy work that his average wages may be $.60 per day?

146. The triangular gable of a certain building has a base of 44 ft. and an altitude of 18 ft. How many square feet of boards will cover the two gables?

147. H. Jones & Co. failed in business. They owed A $4,000, B $5,000, and C $7,000; their assets amounted to $11,536, and the charges of the assignees were 3% on the amount distributed. What % did they pay? and how much did each creditor receive?

148. A lot of land, containing 15 acres, is 30 rods wide, and is a plane inclining in the direction of its length; one end being 120 feet higher than the other. How many acres of surface does the inclined plane contain?

149. By selling sugar at $15 per cwt. I gain 20%; what % should I gain by selling it at $13.50 per cwt.?

150. A man bought $\frac{3}{8}$ of a vessel, and sold $\frac{4}{5}$ of his share for $11,700, which was 30% above the cost. What was the cost of the vessel?

151. A merchant sold 238 hhd. of sugar, each containing 963 pounds net weight, at 13 cents a pound, on 4 months' time, and immediately got the paper discounted at a bank at 7%. How much money did he receive?

152. A. Banks received a legacy of $3,000, $800 of which was payable in 9 months, $800 in one year, and the balance in two years; but the executor being willing to make present payment, discounting at 7%, what ought he to receive?

153. A merchant receives 10,000 barrels of flour to sell on commission, and is directed to invest the proceeds in United States demand notes bearing $7\frac{3}{10}\%$ interest; he pays $759 charges, and sells the flour at $9 per barrel; his commission is 3% on the sales. What amount of Treasury Notes can he buy at 36% premium, brokerage $\frac{1}{2}\%$?

154. What is the present worth of an annuity of $960 in perpetuity at 6%?

155. If $9\frac{7}{8}$ acres of land are bought for \$$301\frac{3}{16}$, what will be the cost of $196\frac{3}{4}$ acres of land, worth $\frac{2}{3}$ as much per acre?

156. A ball falling from a height of 12 ft. bounds 6 ft. by its elasticity, and again falling, bounds 3 ft., and so on, bounding each time $\frac{1}{2}$ as high as it falls. How far will the ball fall before coming to a state of rest? and what will be the distance of all the successive bounds?

157. A person exchanged 180 shares of 6 per cent. stocks, at 80%, for 10 per cent. stocks, at 125%. How much was his yearly income increased?

158. What is the present value of a reversionary lease of $100, commencing 14 years hence, and to continue 20 years, compound interest at 5 per cent.?

159. Sold coffee at $13\frac{1}{3}$ cents a pound, and thereby lost 20% on the cost; afterward sold a quantity of the same for $455, and gained 30%. What quantity was sold? and at what price?

160. If a certain number of workmen can do a piece of work in 25 da., in what time will $1\frac{2}{3}$ of that number of men do a piece of work twice as great, supposing 2 of the first set can do as much work in an hour as 3 of the second set can do in $1\frac{1}{2}$ hours, and that the second set work half as long a day as the first set?

161. A broker bought 90 shares of $100 each of New York Central R. R. stock at 127%, and sold the same at $136\frac{1}{2}$%. How much was the net gain?

162. For what sum must a note be drawn at 3 mo. that the proceeds, when discounted at a bank at 7%, shall be \$$981.91\frac{2}{3}$?

163. A circular cistern 7 ft. in diameter has a capacity of 2,400.06 gallons. What is its depth?

164. A gentleman laid out a garden in the form of an ellipse, its longer diameter being 8 rods, and its shorter 5 rods. What was the area of the garden?

165. If stock, bought at 20% premium, pay 6¼% on the investment, what % will it pay if bought at 5% discount?

166. A man paid $165 to 55 laborers, consisting of men, women, and boys; to the men he paid $5 a week, to the women $1 a week, and to the boys $½ a week. How many were there of each?

167. The length of a rectangular field containing 13 A. 125 P. is to its breadth as 9 to 5. What are its dimensions?

168. A merchant in New York gave $3189.90 for a bill of exchange on London for £651. What was the rate of exchange?

169. What will the gilding of a ball 1 ft. 9 in. in diameter cost at 2s. 6d. per square inch?

170. If 10 horses in 50 days consume 5 tons of hay, how long will 8⅖ tons last 6 horses, 20 cows, and 30 sheep, supposing each cow to eat ½ as much as a horse, and each sheep ⅓ as much as a cow?

171. A man bequeathed his property, amounting to $30,000, to his wife and three children as follows: The wife was to have ⅓, and the remainder was to be divided so that the shares of the children at simple interest at 6% should all amount to the same sum when they were 18 years old; the ages of the children were respectively 4 yr., 5 yr. 6 mo., and 7 yr. 3 mo. What was the share of each child?

172. C. L. King bought 50 shares of bank stock at an advance of 5% on the par value of $100. From the time of purchase until the end of 3 yr. 9 mo. he received a semi-annual dividend of 3½%, when he sold the stock at a premium of 10%. Money being 6% compound interest, how much did he gain?

173. A person wishes to discharge a debt of $1,125 in 18 annual payments, which shall increase in arithmetical progression. How much must his first payment be in order that the last may be 120?

174. The present worth of an annuity to be continued 10 years at 6 per cent., compound interest, compounded annually, is $7,360.08. What is the annuity?

175. A pipe 1¼ inches in diameter will fill a cistern in 40 minutes. In what time will 6 pipes, each ¾ of an inch in diameter, fill a cistern of three times the capacity?

176. A offers to loan B $1,000 for 6 mo., at 10%; the legal rate is 7%. For what sum must the note be drawn that the amount of it at 7% will equal the amount of $1,000 at 10% for the given time?

177. The duty at 30% on a quantity of coffee in bags, each weighing 175 pounds gross, and invoiced at $.14 a pound, was $3,491.25. Tare being 5%, how many bags were imported?

178. What % in advance of the cost must a merchant mark his goods, so that, allowing 4% of his sales for bad debts, an average credit of 3 months, and 8% of the cost of the goods for expenses, his net gain may be 15% of the first cost of the goods, money being worth 7%?

179. What is the present worth of an annuity of $1,200 in reversion 7 years, and continuing 13 years, at 6%?

180. A gentleman deposited in a savings bank for his son, 15 years of age, a sum of money, which, at 5% compound interest, payable semi-annually, amounted to $10,000 at his majority. What was the sum deposited?

181. An English Company is formed in which the liability of each partner is limited to the amount of his shares. There are 500 shares of £10 each; after 3 calls have been made of £2 on a share, the concern fails, and its affairs are wound up. At this period its assets amount to £10217 0s. 0¾d. and its liabilities to £15763 17s. 6d. How much will the company be able to pay on the pound after all the remaining calls are paid up?

182. A merchant in Syracuse, N. Y., purchased a draft on Chicago for $2,660, drawn at 60 days, paying $2,570.89. What was the course of exchange?

183. Imported 12 casks of wine, each containing 42 gallons, invoiced at $3.25 per gallon; paid $96 for freight, and a duty of 40%. How much shall I gain % in selling the whole for $2,747.58?

184. What sum must be invested in 8 per cent. stocks, at 130%, to produce an annual income of $2,000?

185. The duty on an invoice of 300 dozen London porter, at 30%, was $190.512; breakage, 2%. Required the invoiced price per dozen.

186. Two men in Hartford, Conn., hire a carriage for $20 to go to Waterbury, 40 miles distant, and back again, with the privilege of taking in 3 more persons. Having gone 10 miles, they take in A; at Waterbury they take in B; and on their return, when 20 miles from Hartford, they take in C. How much, respectively, shall A, B, and C pay?

187. What costs a bill on London for £800 17s. 6d., when the rate of exchange is $4.91½?

188. A miller grinds 500 bushels of provender, worth 75 cents a bushel, from 40 bushels of rye, worth 90 cents a bushel, and from oats worth 60 cents, corn worth 85 cents, and barley worth 80 cents a bushel. How many bushels of oats, corn, and barley may he take?

189. A gentleman purchased an annuity of $1,000, to continue 20 years, at 6%, compound interest. What did it cost him?

190. A father divided his property among his four sons, directing that A should have $6 as often as B $5, C $3 as often as A $4, and D $8 as often as B $9. What was the amount of property, D's share being $6,000?

191. J. Ellis & Co. sold Thomas Strong goods to the amount of $2,500, on 6 months' credit; Strong paid $350 in 2 months, $600 in 4 months, $500 in 7 months, and the balance in 12 months. What amount was due at the time of settlement, interest 7%?

192. A and B engage in trade; A puts in $10,000, and at the end of 5 months takes out a certain sum; B puts in $6,000, and after 3 months puts in $4,000 more; at the end of the year A's gain is $1,800, and B's $2,250. What sum did A withdraw at the end of 5 months?

193. A merchant bought a certain quantity of corn, for which he paid a certain sum of money; but on measuring, he found only $\frac{39}{40}$ of the quantity he expected. He sold it, gaining $\frac{1}{8}$ the cost, and received $2,160, which was at the rate of 12$\frac{4}{13}$ cents per bushel more than he would have paid had he received the quantity he expected. How many *bushels did he supp*ose he had bought, and at what price?

TABLE

Showing the amount of $1, or £1, at 4, 5, 6, 7, 8, 9, and 10 per cent., Compound Interest, for any number of years from 1 to 40.

Yrs.	4 per ct.	5 per ct.	6 per ct.	7 per ct.	8 per ct.	9 per ct.	10 per ct.
1	1.040000	1.050000	1.060000	1.070000	1.080000	1.090000	1.100000
2	1.081600	1.102500	1.123600	1.144900	1.166400	1.188100	1.210000
3	1.124864	1.157625	1.191016	1.225043	1.259712	1.295029	1.331000
4	1.169859	1.215506	1.262477	1.310796	1.360489	1.411582	1.464100
5	1.216653	1.276282	1.338226	1.402552	1.469328	1.538624	1.610510
6	1.265319	1.340096	1.418519	1.500730	1.586874	1.677100	1.771561
7	1.315932	1.407100	1.503630	1.605782	1.713824	1.828039	1.948717
8	1.368569	1.477455	1.593848	1.718186	1.850930	1.992563	2.143588
9	1.423312	1.551328	1.689479	1.838459	1.999005	2.171893	2.357948
10	1.480244	1.628885	1.790848	1.967151	2.158925	2.367364	2.593742
11	1.539454	1.710339	1.898299	2.104852	2.331639	2.580426	2.853117
12	1.601032	1.795856	2.012197	2.252192	2.518170	2.812665	3.138428
13	1.665074	1.885649	2.132928	2.409841	2.719624	3.065805	3.452271
14	1.731676	1.979932	2.260904	2.578534	2.937194	3.341727	3.797498
15	1.800944	2.078928	2.396558	2.759032	3.172169	3.642482	4.177248
16	1.872981	2.182875	2.540352	2.952164	3.425943	3.970306	4.594973
17	1.947901	2.292018	2.692773	3.158815	3.700018	4.327633	5.054470
18	2.025817	2.406619	2.854339	3.379932	3.996020	4.717120	5.559917
19	2.106849	2.526950	3.025600	3.616528	4.315701	5.141661	6.115909
20	2.191123	2.653298	3.207136	3.869685	4.660957	5.604411	6.727500
21	2.278768	2.785963	3.399564	4.140562	5.033834	6.108808	7.400250
22	2.369919	2.925261	3.603537	4.430402	5.436540	6.658600	8.141275
23	2.464716	3.071524	3.819750	4.740530	5.871464	7.257874	8.954302
24	2.563304	3.225100	4.048935	5.072367	6.341181	7.911083	9.849733
25	2.665836	3.386355	4.291871	5.427433	6.848475	8.623081	10.834706
26	2.772470	3.555673	4.549383	5.807353	7.396353	9.399158	11.918176
27	2.883369	3.733456	4.822346	6.213868	7.988062	10.245082	13.109994
28	2.998703	3.920129	5.111687	6.648838	8.627106	11.167139	14.420994
29	3.118651	4.116136	5.418388	7.114257	9.317275	12.172182	15.863093
30	3.243398	4.321942	5.743491	7.612255	10.062657	13.267678	17.449402
31	3.373133	4.538040	6.088101	8.145113	10.867669	14.461769	19.194342
32	3.508059	4.764942	6.453387	8.715271	11.737083	15.763329	21.113777
33	3.648381	5.003189	6.840590	9.325340	12.676050	17.182028	23.225154
34	3.794316	5.253348	7.251025	9.978114	13.690134	18.728411	25.547670
35	3.946089	5.516015	7.686087	10.676582	14.785344	20.413968	28.102437
36	4.103933	5.791816	8.147252	11.423942	15.968172	22.251225	30.912680
37	4.268090	6.081407	8.636087	12.223618	17.245626	24.253835	34.003949
38	4.438813	6.385477	9.154252	13.079271	18.625276	26.436680	37.404343
39	4.616366	6.704751	9.703508	13.984820	20.115298	28.815982	41.144778
40	4.801021	7.039989	10.285718	14.974458	21.724522	31.409420	45.259256

LIFE INSURANCE.

The principal kinds of *Life Policies* issued are—

1st. Life policies, payable at the death of the person insured, the annual premium to continue during life, called continued premium life policies.

2d. Life policies, payable at the death of the person insured, the annual premium to continue 10 years, 5 years, or only 1 year, called ten, five, or single payment policies.

LIFE TABLE.

ANNUAL PREMIUM ON A POLICY OF $1,000.

POLICY PAYABLE AT DEATH ONLY.

Age at Issue.	Payments during life.	Payment for 10 years only.	Payment for 5 years only.	Single Payment.
25	$19.89	$42.56	$73.87	$326.58
26	20.40	43.37	75.25	332.58
27	20.93	44.22	76.69	338.83
28	21.48	45.10	78.18	345.31
29	22.07	46.02	79.74	352.05
30	22.70	46.97	81.36	359.05
31	23.35	47.98	83.05	366 33
32	24.05	49.02	84.80	373.89
33	24.78	50.10	86.62	381.73
34	25.56	51.22	88.52	389.88
35	26.38	52.40	90.49	398.34
36	27.25	53.63	92.54	407.11
37	28.17	54.91	94.67	416.21
38	29.15	56.24	96.89	425.64
39	30.19	57.63	99.19	435.42
40	31.30	59.09	101.59	445.55
41	32.47	60.60	104.08	456.04
42	33.72	62.19	106.66	466.89
43	35.05	63.84	109.34	478.11
44	36.46	65.57	112.18	489.71
45	37.97	67.37	115.02	501.69
46	39.58	69.26	118.02	514.04
47	41.30	71.25	121.15	526.78
48	43.13	73.32	124.28	539.88
49	45.09	75.49	127.74	553.33
50	47.18	77.77	131.21	567.13
51	49.40	80.14	134.80	581.24
52	51.78	82.63	138.51	595.66
53	54.31	85.22	142.34	610.36
54	57.02	87.94	146.30	625.33
55	59.91	90.79	150.38	640.54
56	63.00	93.78	154.60	655.99
57	66.29	96.91	158.94	671.64
58	69.82	100.21	163.43	687.48
59	73.60	103.68	168.07	703.49
60	77.63	107.35	172.87	719.65

Two kinds of *Endowment Policies* are issued:

1st. Endowment policies, payable to the person insured at the end of a certain number of years, as 10, 15, 20, 25, 30, or 35, or to his heirs if he dies sooner. Annual premium to continue during the existence of the policy.

2d. Endowment policies, payable as the preceding, but the payments all to be made in one, five, or ten years.

ENDOWMENT TABLE.

ANNUAL PREMIUM TO SECURE $1,000, payable at the end of 35, 30, 25, etc., Years, or at Death if prior, Premiums to continue until Policy matures.

AGE.	In 35 years.	In 30 years.	In 25 years.	In 20 years.	In 15 years.	In 10 years.
25	$26.33	$30.61	$37.17	$47.68	$66.02	$103.91
26	26.57	30.80	37.34	47.82	66.15	104.03
27	26.83	31.02	37.52	47.98	66.29	104.16
28	27.11	31.25	37.72	48.15	66.44	104.29
29	27.42	31.50	37.92	48.33	66.60	104.43
30	27.76	31.78	38.16	48.53	66.77	104.58
31	28.13	32.09	38.41	48.74	66.96	104.75
32	28.54	32.43	38.69	48.97	67.16	104.92
33	28.98	32.79	38.98	49.22	67.36	105.11
34	29.46	33.19	39.31	49.49	67.60	105.31
35	30.00	33.63	39.68	49.79	67.85	105.53
36	30.58	34.11	40.07	50.11	68.12	105.75
37	31.22	34.64	40.50	50.47	68.41	106.00
38	31.93	35.23	40.98	50.86	68.73	106.28
39	32.70	35.88	41.52	51.30	69.09	106.58
40	33.55	36.59	42.10	51.78	69.49	106.90
41		37.38	42.75	52.31	69.92	107.26
42		38.24	43.47	52.89	70.40	107.65
43		39.19	44.26	53.54	70.92	108.08
44		40.23	45.12	54.25	71.50	108.55
45		41.37	46.08	55.04	72.14	109.07
46			47.15	55.91	72.86	109.65
47			48.32	56.89	73.66	110.30
48			49.61	57.96	74.54	111.01
49			51.04	59.15	75.51	111.81
50			52.60	60.45	76.59	112.68
51				61.90	77.77	113.64
52				63.48	79.07	114.70
53				65.22	80.51	115.86
54				67.14	82.09	117.14
55				69.24	83.82	118.54
56					85.73	120.09
57					87.84	121.78
58					90.15	123.64
59					92.70	125.70
60					95.50	127.96

TABLE I.

Showing the FINAL VALUE *of an Annuity of One Dollar per annum. Compound Interest, from 1 year to 40, inclusive.*

YRS.	3 per ct.	3½ per ct.	4 per ct.	5 per ct.	6 per ct.	7 per ct.
1	1.000 000	1.000 000	1.000 000	1.000 000	1.000 000	1.000 000
2	2.030 000	2.035 000	2.040 000	2.050 000	2.060 000	2.070 000
3	3.090 900	3.106 225	3.121 600	3.152 500	3.183 600	3.214 900
4	4.183 627	4.214 943	4.246 464	4.310 125	4.374 616	4.439 943
5	5.309 136	5.362 466	5.416 323	5.525 631	5.637 093	5.750 739
6	6.468 410	6.550 152	6.632 975	6.801 913	6.975 319	7 153 291
7	7.662 462	7.779 408	7.898 294	8.142 008	8.393 838	8.654 021
8	8.892 336	9.051 687	9.214 226	9.549 109	9.897 468	10.259 803
9	10.159 106	10.368 496	10.582 795	11.026 564	11.491 316	11.977 989
10	11.463 879	11.731 393	12.006 107	12.577 893	13.180 795	13.816 448
11	12.807 796	13.141 992	13.486 351	14.206 787	14.971 643	15.783 599
12	14.192 030	14.601 962	15.025 805	15.917 127	16.869 941	17.888 451
13	15.617 790	16.113 030	16.626 838	17.712 983	18.882 138	20.140 643
14	17.086 324	17.676 986	18.291 911	19.598 632	21.015 066	22.550 488
15	18.598 914	19.295 681	20.023 588	21.578 564	23.275 970	25.129 022
16	20.156 881	20.971 030	21.824 531	23.657 492	25.670 528	27.888.054
17	21.761 588	22.705 016	23.697 512	25.840 366	28.212 880	30.840 217
18	23.414 435	24.499 691	25.645 413	28.132 385	30.905 653	33.999 033
19	25.116 868	26.357 180	27.671 229	30.539 004	33.759 992	37.378 965
20	26.870 374	28.279 682	29.778 079	33.065 954	36.785 591	40.995 492
21	28.676 486	30.269 471	31.969 202	35.719 252	39.992 727	44.865 177
22	30.536 780	32.328 902	34.247 970	38.505 214	43.392 290	49.005 739
23	32.452 884	34.460 414	36.617 889	41.430 475	46.995 828	53.436 141
24	34.426 470	36.666 528	39.082 604	44.501 999	50.815 577	58.176 671
25	36.459 264	38.949 857	41.645 908	47.727 099	54.864 512	63.249 030
26	38.553 042	41.313 102	44.311 745	51.113 454	59.156 383	68.676 470
27	40.709 634	42.759 060	47.084 214	54.669 126	63.705 766	74.483 823
28	42.930 923	46.290 627	49.967 583	58.402 583	68.528 112	80.697 691
29	45.218 850	48.910 799	52.966 286	62.322 712	73.639 798	87.346 529
30	47.575 416	51.622 677	56.084 938	66.438 848	79.058 186	94.460 786
31	50.002 678	54.429 471	59.328 335	70.760 790	84.801 677	102.073 041
32	52.502 759	57.334 502	62.701 469	75.298 829	90.899 778	110.218 154
33	55.077 841	60.341 210	66.209 527	80.063 771	97.343 165	118.933 425
34	57.730 177	63.453 152	69.857 909	85.066 959	104.183 755	128.258 765
35	60.462 082	66.674 013	73.652 225	90.320 307	111.434 780	138.236 878
36	63.271 944	70.007 603	77.598 314	95.836 323	119.120 867	148.913 460
37	66.174 223	73.457 869	81.702 246	101.628 139	127.268 119	160.337 400
38	69.159 449	77.028 895	85.970 336	107.709 546	135.904 206	172.561 020
39	72.234 233	80.724 906	90.409 150	114.095 023	145.058 458	185.640 292
40	75.401 260	84.550 278	95.025 516	120.799 774	154.761 966	199.635 112

TABLE II.

Showing the PRESENT WORTH *of an Annuity of One Dollar per annum, at Compound Interest, from 1 year to 40, inclusive.*

Yrs.	3 per ct.	3½ per ct.	4 per ct.	5 per ct.	6 per ct.	7 per ct.
1	0.970 874	0.966 184	0.961 538	0.952 381	0.943 396	0.934 579
2	1.913 470	1.899 694	1.886 095	1.859 410	1.833 393	1.808 017
3	2.828 611	2.801 637	2.775 091	2.723 248	2.673 012	2.624 314
4	3.717 098	3.673 079	3.629 895	3.545 951	3.465 106	3.387 209
5	4.579 707	4.515 052	4.451 822	4.329 477	4.212 364	4.100 195
6	5.417 191	5.328 553	5.242 137	5.075 692	4.917 324	4.766 537
7	6.230 283	6.114 544	6.002 055	5.786 373	5.582 381	5.389 286
8	7.019 692	6.873 956	6.732 745	6.463 213	6.209 744	5.971 295
9	7.786 109	7.607 687	7.435 332	7.107 822	6.801 692	6.515 228
10	8.530 203	8.316 605	8.110 896	7.721 735	7.360 087	7.023 577
11	9.252 624	9.001 551	8.760 477	8.306 414	7.886 875	7.498 699
12	9.954 004	9.663 334	9.385 074	8.863 252	8.383 844	7.942 671
13	10.634 955	10.302 738	9.985 648	9.393 573	8.852 683	8.357 635
14	11.296 073	10.920 520	10.563 123	9.898 641	9.294 984	8.745 452
15	11.937 935	11.517 411	11.118 387	10.379 658	9.712 249	9.107 898
16	12.561 102	12.094 117	11.652 296	10.837 770	10.105 895	9.446 632
17	13.166 118	12.651 321	12.165 669	11.274 066	10.477 260	9.763 206
18	13.753 513	13.189 682	12.659 297	11.689 587	10.827 603	10.059 070
19	14.323 799	13.709 837	13.133 939	12.085 321	11.158 116	10.335 578
20	14.877 475	14.212 403	13.590 326	12.462 210	11.469 421	10.593 997
21	15.415 024	14.697 974	14.029 160	12.821 153	11.764.077	10.835 527
22	15.936 917	15.167 125	14.451 115	13.163 003	12.041 582	11.061 241
23	16.443 608	15.620 410	14.856 842	13.468 574	12.303 379	11.272 187
24	16.935 542	16.058 368	15.246 963	13.798 642	12.550 358	11.469.334
25	17.413 148	16.481 415	15.622 080	14.093 945	12.783 356	11.653 583
26	17.876 842	16.890 352	15.982 769	14.275 185	13.003 166	11.825 779
27	18.327 031	17.285 365	16.329 586	14.643 034	13.210 534	11.986 709
28	18.764 108	17.667 019	16.663 063	14.898 127	13.406 164	12.137 111
29	19.188 455	18.035 767	16.983 715	15.141 074	13.590 721	12.277 674
30	19.600 441	18.392 045	17.292 033	15.372 451	13.764 831	12.409 041
31	20.000 428	18.736 276	17.588 494	15.592 811	13.929 086	12.531 814
32	20.388 766	19.068 865	17.873 552	15.802 677	14.084 043	12.646 555
33	20.765 792	19.390 208	18.147 646	16.002 549	14.230 230	12.753 790
34	21.131 837	19.700 684	18.411 198	16.192 204	14.368 141	12.854 009
35	21.487 220	20.000 661	18.664 613	16.374 194	14.498 246	12.947 672
36	21.832 252	20.290 494	18.908 282	16.546 852	14.620 987	13.035 208
37	22.167 235	70.570 525	19.142 579	16.711 287	14.736 780	13.117 017
38	22.492 462	20.841 087	19.367 864	16.867 893	14.846 019	13.193 473
39	22.808 215	21.102 500	19.584 485	17.017 041	14.949 075	13.264 928
40	23.114 772	21.355 072	19.792 774	17.159 086	15.046 297	13.331 709

TABLE III,

Showing the values of Annuities on Single Lives, according to the Carlisle Table of Mortality.

Age.	4 per cent.	5 per ct.	6 per ct.	7 per ct.	Age.	4 per ct.	5 per ct.	6 per ct.	7 per ct.
0	14.28164	12.083	10.439	9.177	45	14.10460	12.648	11.428	10.397
1	16.55455	13.995	12.078	10.605	46	13.88928	12.480	11.296	10.292
2	17.72616	14.983	12.925	11.342	47	13.66208	12.301	11.154	10.178
3	18.71508	15.824	13.652	11.978	48	13.41914	12.107	10.998	10.052
4	19.23133	16.271	14.042	12.322	49	13.15312	11.892	10.823	9.908
5	19.59203	16.590	14.325	12.574	50	12.86902	11.660	10.631	9.749
6	19.74502	16.735	14.460	12.698	51	12.56581	11.410	10.422	9.573
7	19.79019	16.790	14.518	12.756	52	12.25793	11.154	10.208	9.392
8	19.76443	16.786	14.526	12.770	53	11.94503	10.892	9.988	9.205
9	19.69114	16.742	14.500	12.704	54	11.62673	10.624	9.761	9.011
10	19.58339	16.669	14 448	12.717	55	11.29961	10.347	9.524	8.807
11	19.45857	16.581	14.384	12.669	56	10.96607	10.063	9.280	8.595
12	19.33493	16.494	14.321	12.621	57	10.62559	9.771	9.027	8.375
13	19.20937	16.406	14.257	12.572	58	10.28647	9.478	8.772	8.153
14	19.08182	16.316	14.191	12.522	59	9.96331	9.199	8.529	7.940
15	18.95534	16.227	14.126	12.473	60	9.66333	8.940	8.304	7.743
16	18.83636	16.144	14.007	12.429	61	9.39809	8.712	8.108	7.572
17	18.72111	16.066	14.012	12.389	62	9.13676	8.487	7.913	7.403
18	18.60656	15.987	13 956	12.348	63	8.87150	8.258	7.714	7.229
19	18.48649	15.904	13.897	12.305	64	8.59330	8.016	7.502	7.042
20	18.36170	15.817	13.835	12.259	65	8.30719	7.765	7.281	6.847
21	18.23196	15.726	13.769	12.210	66	8.00966	7.503	7.049	6.641
22	18.09386	15.628	13.697	12.156	67	7.69980	7.227	6.803	6.421
23	17.95016	15.525	13.621	12.098	68	7.37976	6.941	6.546	6.180
24	17.80058	15.417	13.541	12 037	69	7.04881	6.643	6.277	5.945
25	17.64486	15.303	13.456	11.972	70	6.70936	6.336	5.998	5.690
26	17.48586	15.187	13.368	11.904	71	6.35773	6.015	5.704	5.420
27	17.32023	15.065	13.275	11.832	72	6.02548	5.711	5.424	5.162
28	17.15412	14.942	13.182	11.759	73	5.72465	5.435	5.170	4.927
29	16.99683	14.827	13.096	11.693	74	5.45812	5.190	4.944	4.719
30	16.85215	14.723	13.020	11.636	75	5.23901	4.989	4.760	4.549
31	16.70511	14.617	12.942	11.578	76	5.02399	4.792	5.579	4.382
32	16.55246	14.506	12.860	11.516	77	4.82473	4.609	4.410	4.227
33	16.39072	14.387	12.771	11.448	78	4.62166	4.422	4.238	4.067
34	16.21943	14.260	12.675	11.374	79	4.39345	4.210	4.040	3.883
35	16.04123	14.127	12.573	11.295	80	4.18289	4.015	3.858	3.713
36	15.85577	13.987	12.465	11.211	81	3.95309	3.799	3.656	3.523
37	15.66586	13.843	12.354	11.124	82	3.74034	3.606	3.474	3.352
38	15.47129	13.695	12.239	11.033	83	3.53409	3.406	3.286	3.174
39	15.27184	13.542	12.120	10.939	84	3.32856	3.211	3.102	2.999
40	15.07363	13.390	12.002	10.845	85	3.11515	3.009	2.909	2.815
41	14.88314	13.245	11.890	10.757	86	2.92831	2.830	2.739	2.652
42	14.69466	13.101	11.779	10.671	87	2.77593	2.685	2.599	2.519
43	*14.50529*	12.957	11.668	10.585	88	2.68337	2.597	2.515	2.439
44	*14.30874*	*12.806*	*11.551*	10.494	89	2.57704	2.495	2.417	2.344

ANSWERS.

P.	Ex.	Answers.
53	*1*	377,097 sq. mi.
“	*2*	$5,999,964.
“	*3*	85 daily, and 148 over.
“	*4*	Between 3 and 4 P.M.
“	*5*	Q. V. 52 yr.; P.W. 30 yr.
“	*6*	$130,200.
54	*7*	769,916 sq. mi.
“	*8*	13 da. 5 hr.
“	*9*	$454,116,028 total. $6,678,176.88 monthly.
“	*10*	$81.47 +
“	*11*	1,909,571.
“	*12*	$34,420.30, nearly.
“	*13*	$7,000.
“	*14*	$26,333.03 +.
“	*15*	480.
55	*16*	$1,111.807.
“	*17*	1,937,271 total: 193727 + average.
“	*18*	105.
“	*19*	2,535 mi.
“	*20*	$14,250.
“	*21*	35 states and 1,356 sq. mi. over.
“	*22*	7,871$\frac{1}{5}$ sq. mi.
56	*23*	691,904 acres.
“	*24*	$25,101,238.
“	*25*	$19,294.
“	*26*	$40,000 per mile. $8,000 yearly income. 5 years to pay the cost.
56	*27*	$220.
“	*28*	17 mi.
“	*29*	36.
“	*30*	52,406.
“	*31*	17.
57	*32*	$6 per head gain. 220 No. bought.
“	*33*	1,074,561.
“	*34*	173,715 miles.
“	*35*	20,552 sq. miles.
“	*36*	$35,260.
“	*37*	3,238 years.
58	*38*	$109.
“	*39*	$36.
“	*40*	$1,120.
“	*41*	10,196,400.
“	*42*	$1,957.
“	*43*	96,847,073 stamps. $3,676,218.52 value.
“	*44*	8 years.
“	*45*	128 boxes.
59	*46*	3,100 school-houses.
“	*47*	$81,016.
“	*48*	84 boxes.
“	*49*	532.
“	*50*	9,253,764.
“	*51*	139,180.
“	*52*	215 tons.
“	*53*	$101,601,916.88.
60	*54*	$120.
“	55	1,720 A.; $13 per A.

P.	Ex.	Answers.
60	*56*	$385.
"	*57*	1,520 and 967.
"	*58*	21 hours.
"	*59*	356.
"	*60*	7.
"	*61*	227 +.
61	*62*	$42,638.50 per mile.
"	*63*	25,000 A.; $19,861.50 more per mile.
"	*64*	8,666,217 A.; 3,720,000 bales.
"	*65*	$264,864,000.
"	*66*	$15,775.
62	*67*	1,239,048 sq. mi.; 697,764,077 pop.
"	*68*	1,683,036 sq. mi.; 24,253,823 pop.
"	*69*	4,776,914 sq. mi. more in N. A.; 244,872,691 more pop. in Eu.
"	*70*	2,919,496 sq. mi.; 141,592,294 pop.
"	*71*	$267,150.13 +.
"	*72*	$276.40 + in N. E.; $298.33 + in N. Y.
63	*73*	462 pounds.
"	*74*	$18.
"	*75*	425.
"	*76*	A, $1,350; B, $2,250; C, $1,440; D, $2,160.
"	*77*	3.
"	*78*	$62.
"	*79*	225, or 75 each.
"	*80*	365.
"	*81*	91.
64	*82*	94,500.
"	*83*	61.
"	*84*	30 oxen; 10 horses.
"	*85*	S. B., 15 ct.; C, 24 ct.; *R. R, 11 ct.*
64	*86*	14839.
"	*87*	403.
"	*88*	512,636.
65	*89*	9,336.
"	*90*	$112,340.
"	*91*	785 yards. $5 gain per yard.
"	*92*	$6.
"	*93*	7,083,933 not named. 3,280,000 more Catholics.
"	*94*	187,562 for one; 288,641 the other.
"	*95*	$190 cost; $175 selling price.
"	*96*	21 yd. each.
66	*97*	24,600.
"	*98*	1,300 votes.
"	*99*	31,680 fore wheels; 22,176 hind wheels.
"	*100*	360.
"	*101*	5 of each.
"	*102*	9 classes of ladies; 8 of gentlemen.
"	*103*	23,849.
"	*104*	800 and 200.
67	*105*	2,350,000.
"	*106*	One, 13 miles; tne other, 7 miles.
"	*107*	$11,470.
"	*108*	10 cents.
"	*109*	$5,000.
"	*110*	13,659 pensioners; $1,227,643 paid.
"	*111*	49 cents less.
"	*112*	15 barrels.
68	*113*	$90,450,000.
"	*114*	Lost $1,265.
"	*115*	20 bu. those who left; 70 bu. the others.

P.	Ex.	ANSWERS.
68	*116*	17.
"	*117*	$59.
"	*118*	12 days.
"	*119*	12.
"	*120*	15,498 sheep.

CHAPTER III.

P.	Ex.	ANSWERS.
77	*1*	20 melodeons.
"	*2*	$906,250,000.
"	*3*	Corn $1.25; oats $.90.
"	*4*	$9.10.
"	*5*	$\frac{25}{75}$.
"	*6*	56.25 yd. in length.
"	*7*	1st., $960; 2d., $640; 3d., $320.
"	*8*	10 bu. of each.
78	*9*	A, 5; B, 9; and C, 12.
"	*10*	$1,322,000.
"	*11*	84 scholars; 24 desks.
"	*12*	1,001.
"	*13*	109 bushels.
"	*14*	$6\frac{9}{16}$ barrels.
"	*15*	.5625
"	*16*	200 at 2 cts. each; 150 at 3 cts. each.
79	*17*	$\$1,597.36\frac{7}{8}$.
"	*18*	84 times.
"	*19*	15,650,000 copies. $469,500 value.
"	*20*	.0122+.
"	*21*	$\frac{4}{65}$.
"	*22*	$\frac{3}{10}$ of a day.
"	*23*	$5.50.
"	*24*	2.08.
"	*25*	$11\frac{1}{5}$.
"	*26*	186,502 pieces; $3,184,892 value.
80	*27*	$1,125 and $875.
80	*28*	1,076,900 pieces. $358,217.80 value.
"	*29*	$6\frac{16}{105}$.
"	*30*	$\$15.82\frac{13}{16}$.
"	*31*	$\$664.06\frac{1}{4}$.
"	*32*	$25\frac{1}{8}$ bushels.
"	*33*	$.50.
"	*34*	30 bushels.
"	*35*	$456.
"	*36*	600.
"	*37*	$32.75.
"	*38*	$32.071
"	*39*	$50.
81	*40*	$\$228.66\frac{2}{3}$.
"	*41*	2,541,212,537.5.
"	*42*	$.\frac{7}{11}$.
"	*43*	65.
"	*44*	$11.658.
"	*45*	$13\frac{1}{2}$ pounds butter; 12 dozen eggs.
"	*46*	$\$130.634\frac{1}{4}$
"	*47*	$\$48.37\frac{3}{4}$.
"	*48*	$25.211.
"	*49*	$\frac{23}{56}$.
82	*50*	$\frac{2}{45}$.
"	*51*	$261.75.
"	*52*	$\frac{11}{20}$.
"	*53*	.9999998.
"	*54*	.75.
"	*55*	$25.
"	*56*	$489.125.
"	*57*	$\$6,064.62\frac{1}{2}$.
"	*58*	$\frac{3}{4}$ and $\frac{7}{20}$.
"	*59*	$5,400.
"	*60*	$7\frac{1}{5}$ days.
83	*61*	.574751.
"	*62*	4,320,544.8215.
"	*63*	$\frac{5}{8}$ and $\frac{3}{20}$.
"	*64*	B, $\frac{59}{154}$; C, [illegible]
"	65	$1\frac{5}{12}$.

P.	Ex.	Answers.
83	66	$48.675.
"	67	$\frac{1}{10}$.
"	68	191,300,070,000,000.
"	69	2.94\frac{11}{24}$.
"	70	1,249.0259107.
"	71	27 pairs.
"	72	.2679745.
84	73	$454.01 ; $45.401 ; $4.5401.
"	74	.33615 ; .00207.
"	75	8.1 ; .0000375.
"	76	.06424 ; 22.7046.
"	77	2.3025 ; .0625.
"	78	$3\frac{13}{49}$.
"	79	.84 ; 4,602.
"	80	.09375 ; .001679 +.
"	81	.7426 + ; 21.
"	82	56 ; .7854.
"	83	.756 ; .09.
"	84	$79.20.
"	85	17.67\frac{9}{10}$.
"	86	$\frac{5}{8}$; $\frac{3}{8}$; $\frac{2}{125}$.
"	87	.5
"	88	12.72\frac{11}{12}$; gain 20.56\frac{1}{4}$.
"	89	$16\frac{5}{6}$.
85	90	$25.1764 +.
"	91	$\frac{1}{7}$.
"	92	$\frac{12}{13}$; $\frac{7}{11}$; $\frac{421}{431}$; $\frac{3}{8}$.
"	93	$\frac{21}{32}$.
"	94	$224.
"	95	John, 16 ; James, 28.
"	96	7 yards.
"	97	$2\frac{2}{5}$; $70\frac{1}{2}$.
"	98	$120\frac{3}{20}$; $2\frac{1}{70}$.
"	99	$5,205\frac{1}{5}$; $10,636\frac{8}{13}$.
"	100	$\frac{23}{84}$; $\frac{3}{17}$.
"	101	$2\frac{8}{21}$; $29\frac{2}{5}$.
"	102	$956\frac{1}{4}$; $\frac{117}{320}$.
"	103	$3\frac{1}{21}$.
85	104	A, 74 mi. ; B, 59 mi.
86	105	150 feet.
"	106	57 pounds.
"	107	Wheat 20.7 bu. ; potatoes 125 bu.
"	108	$67.835.
"	109	$51.50.
"	110	160 sheep.
"	111	$\frac{2}{3}$; $13\frac{1}{2}$.
"	112	$9\frac{8}{13}$; $\frac{7}{12}$.
"	113	$71\frac{1}{2}$; $2,560\frac{5}{37}$.
"	114	$22\frac{29}{42}$; 4,015.
"	115	$\frac{103}{267}$; $\frac{6}{7}$.
87	116	$\frac{7}{20}$
"	117	.675.
"	118	$30.6\frac{1}{9}$.
"	119	$\frac{3}{7}$.
"	120	5\frac{1}{3}$.
"	121	28.365 tons.
"	122	$26.25.
"	123	$145.50.
"	124	34.03\frac{1}{8}$.
"	125	$17\frac{17}{18}$ bushels.
"	126	$10\frac{9}{10}$ cents.
"	127	21 bushels.
"	128	$550.
88	129	21\frac{7}{9}$.
"	130	$\frac{32}{115}$ of a day.
"	131	$10\frac{13}{16}$ yards.
"	132	$1\frac{19}{26}$.
"	133	40 yards.
"	134	154.
"	135	$1,610,353.99 more.
"	136	$\frac{21}{22}$ of a yard.
"	137	$\frac{1}{16}$.
89	138	Horse, 116\frac{2}{3}$; saddle, 33\frac{1}{3}$; buggy, 103\frac{19}{27}$.
"	139	$3\frac{1}{3}$ times larger.
"	140	$1\frac{13}{55}$ days.

P.	Ex.	Answers.
89	*141*	Buchanan, 1,839,642; Fremont, 1,342,069; Fillmore, 874,760.
"	*142*	$729\frac{1}{12}$ bu.; \$$465\frac{11}{72}$.
"	*143*	B, $62\frac{5}{8}$ bu.; C, $41\frac{3}{4}$ bu.; D, $10\frac{7}{16}$ bu.
"	*144*	$\frac{2}{3}$ of a yard.
"	*145*	196.49.
"	*146*	\$1.25.
"	*147*	\$7.50.
"	*148*	6 acres.
90	*149*	\$$6,846\frac{2}{3}$.
"	*150*	\$13.95.
"	*151*	\$2,828.51.
"	*152*	17.
"	*153*	4 times.
"	*154*	280 pupils.
"	*155*	A, \$825; B, \$1,650; C, \$2,475; D, \$3,300.
"	*156*	\$$5.70\frac{1}{4}$.
"	*157*	325 A.
91	*158*	\$3,316.17.
"	*159*	\$6,166.14.
"	*160*	\$69,927.77.
"	*161*	\$749,902.43.
92	*162*	83 miles.
"	*163*	\$$158.12\frac{1}{2}$.
"	*164*	\$1,479.
"	*165*	40 pounds.
"	*166*	$37\frac{2}{5}$ miles.
"	*167*	$4,008\frac{8}{9}$ yards.
"	*168*	5 times.
"	*169*	Cow, $3\frac{1}{2}$; horse $2\frac{5}{8}$ mo.
"	*170*	\$12.
93	*171*	\$.90.
"	*172*	18 cents.
"	*173*	\$.53 + 15 lb. nails.
"	*174*	$3\frac{3}{14}$ days.
"	*175*	49.995045.
93	*176*	.0425.
"	*177*	60 feet.
"	*178*	\$34.767.
"	*179*	1, 2, 4, 5, 7, 8, 10, 14, 16, 20, 28, 35, 40, 56, 70, 80, 112, 140, 280, 560.
"	*180*	\$700.
94	*181*	128 gallons.
"	*182*	\$1,379.84.
"	*183*	\$318,060,000.
"	*184*	\$5.0685.
"	*185*	\$10.92.
"	*186*	\$$227\frac{1}{4}$.
"	*187*	\$286.75.
"	*188*	\$63.
"	*189*	\$92.72.
"	*190*	\$135.84.
"	*191*	\$14.04.
"	*192*	\$$5.06\frac{1}{4}$.
"	*193*	\$9.30.
"	*194*	\$800.92.
"	*195*	\$17.75.
"	*196*	\$8.679.
"	*197*	\$1.5968.
95	*198*	\$$201.906\frac{1}{4}$.
"	*199*	\$55,992.31.
"	*200*	\$409.20.
"	*201*	\$38.85.
"	*202*	\$94.81.
"	*203*	\$36.864.
"	*204*	\$130.
"	*205*	125 bushels.
"	*206*	A, 3 da.; B, 4 da.; C 6 da.; all, $1\frac{1}{3}$ da.
"	*207*	\$.30.
"	*208*	No. 26,027,300; value, \$787,109.60.
"	*209*	4 bushels.
96	*210*	$\frac{283}{317}$.

P.	Ex.	Answers.
96	*211*	$210.
“	*212*	A, $36; B, $52.
“	*213*	Greatest, 96,856,760 mi.; least, 93,143,240 mi.
“	*214*	$82.03.
“	*215*	B, 41.075 acres; C, 20.825 acres.
97	*216*	$\frac{780.672.286.189.210}{1092}$.
“	*217*	B, $170; C, $1562.
“	*218*	120 bushels.
“	*219*	300 oranges.
“	*220*	5 times.
“	*221*	$1.40.
“	*222*	1,488.375 gallons.
“	*223*	\$$106\frac{521}{720}$.
“	*224*	$10\frac{2}{7}$ bushels.
98	*225*	36 years.
“	*226*	$34\frac{43}{162}$.
“	*227*	$\frac{3}{5}$.
“	*228*	$3,228.34.
“	*229*	$12\frac{2}{9}$ bushels.
“	*230*	\$$31\frac{1}{2}$.
“	*231*	$180.
“	*232*	.15.
“	*233*	$2.25.
“	*234*	.0793692; .00007722.
“	*235*	2.467 + ; 7.482.
“	*236*	23.45; 1.6.
“	*237*	.316 ; 38.4.
99	*238*	$799\frac{5}{16}$; 189.
“	*239*	$5\frac{73}{135}$; $4\frac{114}{143}$.
“	*240*	$3\frac{59}{126}$; 150.
“	*241*	$36\frac{83}{372}$; $\frac{97}{189}$.
“	*242*	$\frac{41}{8316}$; $141\frac{13}{15}$.
“	*243*	$165\frac{33}{64}$; $14\frac{146}{315}$.
“	*244*	$6\frac{111}{1078}$; $\frac{25}{98}$.
“	*245*	$99\frac{163}{1155}$; 2.
“	*246*	$\frac{75}{135}$.
“	*247*	$\frac{36}{48}$; $\frac{8}{48}$; $\frac{30}{48}$; $\frac{44}{48}$.

P.	Ex.	Answers.
99	*248*	630.
“	*249*	2.
“	*250*	$7,350.
“	*251*	288.
100	*252*	48.
“	*253*	$\frac{4}{21}$ of the cost.
“	*254*	17 tons.
“	*255*	\$$2,231.93\frac{1}{4}$.
“	*256*	100 lb.; $.26 cost.
“	*257*	2 times.
“	*258*	$9\frac{1}{11}$ tons coal.
“	*259*	16 yards.
101	*260*	22 and 14.
“	*261*	6 days.
“	*262*	$11\frac{1}{9}$ cents.
“	*263*	20 days.
“	*264*	120 feet.
“	*265*	$211\frac{23}{28}$.
“	*266*	$\frac{19}{27}$ of a day.
“	*267*	860 A.; $13 per A.
“	*268*	1,260 times.
“	*269*	$6 gold; $.43 cur.
“	*270*	A, $8,100; B, $6,400.
102	*271*	$6\frac{11}{60}$.
“	*272*	6, 50 ct.; 24, 25-ct. pieces; 25 each of other pieces.
“	*273*	$1\frac{1}{116}$.
“	*274*	5 rod.
“	*275*	\$$.27\frac{1}{2}$.
“	*276*	Fortune, $11,900; gain, $2,350.
“	*277*	$416.70.
103	*278*	150 cents.
“	*279*	$35,379.
“	*280*	$32\frac{1}{4}$ yards.
“	*281*	18 yards.
“	*282*	$84.854.
“	*283*	$\frac{225455288}{232016751}$.
“	*284*	$360 ; $160 ; $150.

P.	Ex.	Answers.
103	*285*	$97\frac{1}{2}$ acres.
"	*286*	$101.50.
"	*287*	40 bushels.
104	*288*	$42.25.
"	*289*	$36.864.
"	*290*	$\$715.87\frac{1}{2}$.
"	*291*	$.50.
"	*292*	24 pounds.
"	*293*	32.445 miles.
"	*294*	$\$4.208\frac{1}{4}$.
"	*295*	$\$106.87\frac{1}{2}$.
"	*296*	$2.50.
"	*297*	$\$227\frac{1}{4}$.
"	*298*	$752\frac{7}{9}$ acres.
"	*299*	72 sheep; $687\frac{1}{2}$ lb. butter.
"	*300*	$\$1.67\frac{1}{2}$.

CHAPTER IV.

P.	Ex.	Answers.
110	*1*	$13.20.
"	*2*	$1,530.
"	*3*	4,022 bu.
"	*4*	51 men.
"	*5*	2 A. 6 P. 15 sq. yd. $\frac{7}{18}$ sq. ft.
"	*6*	16 min. 12 sec.
"	*7*	$12\frac{58}{85}$ da.
"	*8*	$2,471.40.
"	*9*	$31\frac{13}{27}$ yards.
"	*10*	$57\frac{5}{7}$ lb.; $.45.
111	*11*	30,970.836 lb.
"	*12*	N. A. 2.06 more.
"	*13*	Europe 30.93 more.
"	*14*	2,919,496 sq. miles more; 141,592,294 pop. more; 10.76 more to the sq. mi.
"	*15*	13+ times.
111	*16*	$12.4699 per sq. mi.; $.0195 per A.
"	*17*	Wellington, 83 yr. 4 mo. 13 da., and Napoleon, 53 yr. 3mo. old at death; Wellington, 46 yr. 1 mo. 17 da., and Napoleon, 47 yr. 4 mo. 13 da. old at the battle of Waterloo.
"	*18*	$.245.
112	*19*	6 A. 90 P.
"	*20*	$1\frac{1}{2}$.
"	*21*	$\frac{3}{172}$.
"	*22*	19 gal. 1 qt. 1 pt. $\frac{4}{13}$ gi.
"	*23*	$7.
"	*24*	$\$5,957.551\frac{13}{16}$ gain.
"	*25*	$\$14.54\frac{6}{11}$.
"	*26*	10,000 sheets; 23,547 gr.
"	*27*	1,113,840 sq. in.; 15,520′.
"	*28*	21,880 gr.; 97 mi.
"	*29*	9,984 pt.; £133 6s. 8d.
"	*30*	7,551,368 sq. l.
"	*31*	3 lb. 7 oz. $14.23\frac{1}{3}$ pwt. 5.6 gr.; 100 bu. 3 qt. $1\frac{1}{4}$ pt.
"	*32*	2 mi. 6 fur. 29 rd. $1\frac{1}{2}$ ft.; 86,805 Gt. gr. 6 gr. 8 doz.
"	*33*	A, $360; B, $270; C, $240.
"	*34*	$700.
112	*35*	10 horses.
"	*36*	39 A. 138 P. 6 sq. ft. 64 sq. in.

P.	Ex.	Answers.	P.	Ex.	Answers.
113	*37*	156 P.	116	*74*	39 A. 138 P. 6 sq. ft.
"	*38*	9 hhd. 28 gal. 2 qt.			64 sq. in.
"	*39*	337 yd. 1 ft. 10$\frac{4}{5}$ in.	117	*75*	7,880 ft. 5′.
"	*40*	25 sq. mi.	"	*76*	20 ft. 6′.
"	*41*	3 Cd. 3 cd. ft.	"	*77*	$\frac{8}{175}$.
"	*42*	1 T. 6 cwt. 2 qr. 23	"	*78*	$\frac{639}{8400}$.
"	*43*	lb. 12$\frac{46}{73}$ oz.	"	*79*	21.31\frac{1}{4}$.
		202 yd. 1 ft. 6$\frac{3}{4}$ in.	"	*80*	1,987 da., 9 hr. 22
"	*44*	70 times.			min.
"	*45*	8 A. 109.9 P.	"	*81*	1320 pickets; cost
"	*46*	184 ft. 3′.			$36.30.
"	*47*	2 hhd. 23 gal. 2 qt.	"	*82*	292 mi. 216 rd. 5 yd.
		1 pt.			1 ft.
"	*48*	6 ft. 8′.	"	*83*	5 da. 7 hr. 34 min.
"	*49*	$82.875.			30 sec.; 6$\frac{67}{315}$ oz.
"	*50*	47$\frac{13}{21}$ ounces.	"	*84*	7 fur. 2 ft. 9 in.; £8
114	*51*	18 days.			11s. 10$\frac{149}{220}$d.
"	*52*	A owes B 7$\frac{1}{2}$ cents.	"	*85*	23 A. 120$\frac{60}{221}$ P.
"	*53*	165A. 25$\frac{25}{31}$ P.			33.2475\frac{8}{19}$; 15s. 1d.
"	*54*	5 A. 125 P. 6 sq. yd.	"	*86*	11 cwt. 37 lb. 15.7 +
"	*55*	34,560 steps.			oz.; 3 S. 10° 6′
"	*56*	2$\frac{9}{16}$ lb.			39$\frac{5}{19}$″.
"	*57*	$250.	"	*87*	2 mi. 270 rd. 3$\frac{1}{2}$ yd.
"	*58*	$2.			9$\frac{3}{5}$ in.; 2 A. 33$\frac{1}{3}$ P.
"	*59*	$30.	118	*88*	5 cu. yd. 22 cu. ft.
115	*60*	1 lb. 3 oz. 8 pwt. 21 gr.			1,080 cu. in.; $112-
"	*61*	8$\frac{4}{7}$ mi.			.08$\frac{8}{9}$ entire cost.
"	*62*	94 gal. B; 26 gal. W.	"	*89*	18 da. 5 hr. 11 min.
"	*63*	$343.556.			6$\frac{2}{3}$ sec.
"	*64*	John, 5; Henry, 7;	"	*90*	X, $2,250; Y, $14,250.
		Charles, 9.	"	*91*	7 mi.
"	*65*	$6.	"	*92*	10 mi.
"	*66*	93$\frac{1}{3}$ bu.	"	*93*	14$\frac{1}{4}$ doz.
116	*67*	5$\frac{5}{11}$ days.	"	*94*	A, $2,656; B, $3,414$\frac{6}{7}$.
"	*68*	240 peaches.	119	*95*	7$\frac{1}{2}$ oz.
"	*69*	70 days.	"	*96*	Boy, 71\frac{3}{7}$; girl, 55\frac{5}{9}$.
"	*70*	10 cts per lb.	"	*97*	A, 56 da.; B, 84 da.;
"	*71*	1.12\frac{1}{2}$.			C, 126 da.; D, 252
"	*72*	$3,625.			da.
"	*73*	88 bu. 4 qt.	"	*98*	12$\frac{5}{6}$ hours.

P.	Ex.	ANSWERS.
119	*99*	16,560 rails.
"	*100*	80 and 84 ft.
"	*101*	2 da. 26 min. 15 sec.; 5° 35′ 6″.
"	*102*	210 T. 7 cwt. 88$\frac{1}{7}$ lb.; 146$\frac{3}{5}$ rd.
"	*103*	29 gal. 3 qt. 1 pt. 3$\frac{7}{13}$ gi.; 3 O 2 f℥ 4 fʒ.
"	*104*	2 Cd. 3 cd. ft. 1$\frac{3}{8}$ cu. ft.
"	*105*	2 bundles, 1 ream; $.925.
120	*106*	$55,293,500.80.
"	*107*	48,860 mi.; $40,933.278 per mi.
"	*108*	277 T. 1 cwt. 68.7 + lb.; $194055.324.
"	*109*	51,975 times.
"	*110*	2,751.5 —.
"	*111*	25 men.
"	*112*	38.5 yd.; cost, $91.44.
121	*113*	379.5 mi.
"	*114*	$2,320.50.
"	*115*	$39,600.
"	*116*	$1,241.60.
"	*117*	5 lb. 10$\frac{138}{175}$ oz.
"	*118*	25,523 T. 8 cwt. 75 lb.
"	*119*	$24,031.25.
"	*120*	$192.
"	*121*	$\frac{1}{35}$.
"	*122*	1,428 cu. ft.
122	*123*	190$\frac{2}{3}$ sq. yd.
"	*124*	60, at $\frac{1}{2}$ ct. each; 90, at 3 for 2 ct.
"	*125*	N. J. farmer gained 11$\frac{1}{9}$ bu. oats, worth 4.44\frac{4}{9}$.
"	*126*	$143.54 +.
"	*127*	$.80.
122	*128*	5 oz. 3 pwt. 8 gr.
"	*129*	O 7 f℥ 5 fʒ 7 ♏ 5.
"	*130*	47 bags.
"	*131*	$1,238.17$\frac{1}{2}$.
123	*132*	83$\frac{1}{3}$ reams.
"	*133*	11$\frac{1}{6}$ tons.
"	*134*	8,448 years.
"	*135*	$\frac{5}{7}$.
"	*136*	175.86\frac{6}{29}$ gain.
"	*137*	$182,965.32.
"	*138*	$100.
"	*139*	32 men, each 122 rd. 12$\frac{45}{64}$ ft.; 8 men, each 98 rd. 3$\frac{9}{16}$ ft.
"	*140*	£92 18s. 9d.
124	*141*	A, 165$\frac{30}{31}$ mi.; B, 150$\frac{25}{57}$ mi.
"	*142*	26.58\frac{3}{4}$.
"	*143*	82$\frac{4}{15}$ half crowns; 457.77 + francs.
"	*144*	145.4 + Imp. bu.; 3 lb. 8 oz. 10 pwt.
"	*145*	3,586$\frac{6}{29}$ N. Y. bu.; 156.04 + gal.
"	*146*	33 beer gal.; 1$\frac{17}{33}$ ch.
"	*147*	$121.6625; $77.20.
"	*148*	45.27 Hg.; 3,500 L.
"	*149*	83$\frac{1}{4}$ lb.
"	*150*	1,092.728 mi.
"	*151*	90° 24′ W. long.
125	*152*	$10.56.
"	*153*	$4.17 +.
"	*154*	9.2640625 A.
"	*155*	13 Cd. 68$\frac{1}{32}$ cu. ft.
"	*156*	Rye, $1.15; Barley, $1.00.
"	*157*	127$\frac{5}{7}$ P.
"	*158*	Horse, $150; Carriage, $600.

P.	Ex.	Answers.
125	*159*	$1,260.
126	*160*	213$\frac{1}{3}$ A.
“	*161*	6.69\frac{3}{8}$.
“	*162*	$\frac{73}{100}$ T.
“	*163*	.1150390625 Cong.
“	*164*	$\frac{9}{22}$ sq. rd.
“	*165*	.3965 mi.
“	*166*	$\frac{43}{160}$ of 2 A.
“	*167*	$\frac{3}{5}$ of 1$\frac{3}{7}$ bu.
“	*168*	.625 cwt.
“	*169*	1,155 boards.
“	*170*	2,376 vols.
“	*171*	$6,460.40.
“	*172*	.0065 T.
“	*173*	19$\frac{1}{5}$ bunches.
“	*174*	141.25 bu.
127	*175*	77,440 mi.
“	*176*	8 hr. 59 m. 20 s. A.M.
“	*177*	27$\frac{3}{11}$ min. past 8.
“	*178*	$3.375.
“	*179*	88 P. 97 sq. ft. 12 sq. in.
“	*180*	$660,000.
“	*181*	1° 15′ E.
“	*182*	6 ft.
128	*183*	90° W.; 90° E.; 180° E. or W.
“	*184*	395.92\frac{1}{2}$.
“	*185*	31 yr. 2 mo. 20 da.
“	*186*	$220.
“	*187*	$7.90.
“	*188*	38° 44′ 18.6″.
129	*189*	$1,912.50.
“	*190*	172 da. 20 hr. 47 min. 49$\frac{5}{7}$ sec.
“	*191*	519.53\frac{1}{8}$.
“	*192*	$3535.40; $4242.48.
“	*193*	$6.74.
“	*194*	$\frac{371}{732}$.
“	*195*	15 bales.
129	*196*	526$\frac{2}{9}$ sq. yd.
“	*197*	149 lb. 5 oz. +.
“	*198*	18 oz.
130	*199*	$23.835.
“	*200*	1 ft. 6$\frac{314}{1089}$ in.
“	*201*	56.25, and 43.75.
“	*202*	$7.957 +.
“	*203*	12.50\frac{5}{12}$.
“	*204*	£408 17s. 9$\frac{1}{3}$d.
“	*205*	7 hr. 57 m. 26$\frac{2}{3}$ s. P.M.
“	*206*	60,802,597$\frac{31}{77}$ gal.
“	*207*	122° 26′ 15″ W.
131	*208*	9 hr. 1 min. 41 sec.
“	*209*	2 pounds.
“	*210*	4 da. 10 hr. 34 min. 38 sec.
“	*211*	$29,741.25.
“	*212*	22 hr. 4 min. 48 sec.; 2 mi. 3 rd. 1 yd. 3$\frac{3}{5}$ in.; 42′ 54″.
“	*213*	1 pk. 2 qt.; 133$\frac{1}{3}$ P.; 1 Pi. 27 gal. 2 qt. 1 pt. 3.04 gi.
“	*214*	4 yd. 9 in.; 6 quires, 6 sheets; 6 gross, 10 doz., 3$\frac{3}{7}$ units.
“	*215*	54 P.; 4 T. 5 cwt. 55$\frac{5}{9}$ lb.; 12° 51′ 25$\frac{5}{7}$″.
“	*216*	9 oz. 6 pwt. 16 gr.; 2 cd.ft. 8 cu.ft.; 1 M. 8 dm. 7 cm. 5 mm.
“	*217*	42 P.; 2 lb. 13$\frac{5}{7}$ oz.; ℥ 11 ʒ 2.
“	*218*	1s. 10$\frac{1}{2}$d.; 15s. 6d.; 1s. 6$\frac{2}{3}$d.
“	*219*	3 cwt. 2 qr. 11 lb. 3$\frac{1}{5}$ oz.; 2 rd. 3 yd. 2$\frac{22}{25}$ in.; 1 mi. 302 rd. 1 yd. 8 in.

P.	Ex.	Answers.
131	*220*	10s. 6d.; 7 mo. 15 da.; 39 gal. 1 qt. 1 pt.
"	*221*	$822.639 gain.
"	*222*	75.83\frac{1}{3}$.
132	*223*	1,138 books, $357.
"	*224*	$204.75.
"	*225*	812.95.
"	*226*	$2,010.52$\frac{1}{2}$.
"	*227*	93.86\frac{2}{3}$.
"	*228*	$1,788.15.
133	*229*	51 bags; 1$\frac{11}{16}$ bu. ea.
"	*230*	$.70.
"	*231*	8.
"	*232*	A, 240 A.; B, 300 A.
"	*233*	$199.23+.
"	*234*	£20 10s. 5d.+.
"	*235*	60.
"	*236*	100 yd.
"	*237*	288 yd.
"	*238*	$432.
"	*239*	23,328.
134	*240*	$194.70.
"	*241*	£734 8s. 1d.
"	*242*	$1,330,424.$\dot{2}\dot{4}$.
"	*243*	$133.42.
"	*244*	$390.
"	*245*	$11.25 and $8.75.
"	*246*	98.8 acres.
"	*247*	$\frac{4}{5}$ pwt.; $\frac{5}{6}$ yd.
"	*248*	$\frac{1}{640}$ A.; 1$\frac{1}{2}$ cu. ft.
135	*249*	$\frac{1}{5400}$°; $\frac{1}{160}$ bu.
"	*250*	$\frac{1}{2500}$ T.; $\frac{1}{405}$ hr.
"	*251*	1$\frac{5}{7}$ yd.; $\frac{5}{9}$ l.
"	*252*	$\frac{23}{23}$.
"	*253*	30 da. 23 hr. 25 min. 26$\frac{2}{5}$ sec.
"	*254*	$.83$\frac{1}{3}$.
"	*255*	$25.20.
"	*256*	5 ft. 2$\frac{385}{1728}$ in.
"	*257*	$2; 18 lb.

P.	Ex.	Answers.
135	*258*	2 × 2 × 2 × 5 × 5 × 7.
"	*259*	24.
"	*260*	11,880 bu.
136	*261*	$354.
"	*262*	1.008$\dot{3}$ were sold; 54.11$\dot{6}$ remained.
"	*263*	1,026,864,000.
"	*264*	$210.50.
"	*265*	256$\frac{3}{4}$ sq. yd.
"	*266*	$7.058+.
"	*267*	8 A. 150$\frac{1}{4}$ P.
"	*268*	33.58\frac{3}{8}$.
"	*269*	88 mi. 82 rd.
137	*270*	32,148.
"	*271*	37 bells; 6,577 lb.
"	*272*	118$\frac{1}{5}$ cu. ft. a load; 4.26\frac{2}{3}$ per cord.
"	*273*	£3,215 2s. 5$\frac{3}{8}$d.
"	*274*	$21,588.90.
"	*275*	30 gal.
"	*276*	Corn, 280$\frac{3409}{4301}$ bu.; wheat, 271$\frac{1021}{4301}$ bu.; rye, 604$\frac{596}{4301}$ bu.; money, $1089.666+
138	*277*	108.
"	*278*	25 rd.
"	*279*	1,611$\frac{81}{140}$.
"	*280*	$11,665.72.
"	*281*	$\frac{4}{5}$.
"	*282*	C., 144 T. 1287 lb. Tin, 48 T. 429 lb.
"	*283*	4 hr. 8 min. 36$\frac{2}{3}$ sec.
"	*284*	82849$\frac{5}{193}$ francs.
"	*285*	$602.25.
"	*286*	$\frac{2}{11}$, $\frac{41}{111}$, $\frac{4}{13}$, 6$\frac{28}{37}$.
"	*287*	26\frac{1}{14}$.
"	*288*	28 T. 14 cwt. 21 lb. 14 oz.
"	*289*	$\frac{7}{13}$ hhd.
139	*290*	$\frac{9}{16}$ G. cir.

P.	Ex.	Answers.
139	*291*	$\frac{25}{112}$ of 3 weeks.
“	*292*	$8\frac{1}{3}$ cd.
“	*293*	$\frac{33}{400}$ of 5 lb.
“	*294*	.71 of 4 oz.
“	*295*	5,850 ft.
“	*296*	.03125 mi.
“	*297*	$\frac{1}{2}$.
“	*298*	100 gal.
“	*299*	$721.40.
“	*300*	Sound after flash, $27\frac{13535429}{18272000}$ sec.; ball after sound, $11\frac{2453}{2855}$ sec.
“	*301*	$704.70.
“	*302*	2 A. 58 P.
140	*303*	$.70.
“	*304*	23,779 animals; $592,758.25.
“	*305*	707 hhd. $57\frac{6}{7}$ gal.
“	*306*	6.
“	*307*	443.06\frac{1}{4}$.
“	*308*	$1962\frac{1}{3}$ Bd. ft.
“	*309*	1 wk. 4 da. 14 hr. 50 min. 51 sec.
“	*310*	$4.60.
“	*311*	$\frac{6}{7}$.
141	*312*	$630.50.
“	*313*	86° 21′ W. long.
“	*314*	$827.92+.
“	*315*	167 and 7.
“	*316*	6 ox. 30 c’s, 210 sh’p.
“	*317*	20 A. $129\frac{7}{9}$ P.
“	*318*	22 gi. 44 half pt. 88 pt. 176 qt.
“	*319*	Marriage, Dec. 30, 1868; child’s birthday, Jan. 20, 1872.
“	*320*	Sold, 2.62\frac{1}{2}$; one’s gain, $.17$\frac{1}{2}$; other’s $.26$\frac{1}{4}$.

P.	Ex.	Answers.
142	*321*	$35.86+.
“	*322*	$4\frac{8}{13}$ min. before 12.
“	*323*	$1.225.
“	*324*	60\frac{20}{33}$.
“	*325*	.0625 fa.; .09 of $1\frac{1}{4}$ b.
“	*326*	.00005 mi.; .7 gal.
“	*327*	.0005 M.; .2 pt.
“	*328*	$\frac{11}{76}$.
“	*329*	.001625 T.
“	*330*	$\frac{54}{323}$ sq. rd.
143	*331*	15 T. 12 cwt. $81\frac{1}{4}$ lb.
“	*332*	
“	*333*	240 bu.
“	*334*	2.66\frac{2}{3}$.
“	*335*	$21\frac{3}{7}$ gal.
“	*336*	$3.72+; $3.20.
“	*337*	80 ft.
“	*338*	28° 35.06′.
“	*339*	1 lb. $5\frac{1}{2}$ oz.
“	*340*	$12.
144	*341*	Man, $2\frac{1}{2}$ mi.; boy, 2.
“	*342*	7 boys.
“	*343*	$\frac{1}{15}$.
“	*344*	1st, $4.393; 2d, $11.607; 3d, $9.85; 4th, $1.42.
“	*345*	$1\frac{73}{175}$ lb. avoir.
“	*346*	$320.
“	*347*	$\frac{80}{189}$.
“	*348*	$\frac{3}{4}$ lb. each.
145	*349*	7.85\frac{39}{77}$.
“	*350*	$\frac{7}{16}$ Cd.
“	*351*	Chain, £6 13s. 4d.; pencil, £3 6s. 8d.; watch, £20.
“	*352*	19 bu.
“	*353*	2 Cd.
“	*354*	$485\frac{1}{3}$ bu.
“	*355*	420.
“	*356*	$\frac{1}{281000}$ in.

P.	Ex.	Answers.
145	*357*	\$71.59$\frac{35}{64}$.
146	*358*	4 O 1 f ℥ 2 f ʒ 40 ♏.
"	*359*	36 cents.
"	*360*	\$42.
"	*361*	89$\frac{1}{16}$ yd.
"	*362*	276.64 St. miles.
"	*363*	76,116.48 strokes.
"	*364*	$\frac{3}{5}$ bu.
"	*365*	10 days.
"	*366*	333 times nearly.
147	*367*	One, 46.55 mi.; the other, 38.125 mi.
"	*368*	243 chestnuts.
"	*369*	23 hr. 18 min.
"	*370*	9 hours.
"	*371*	4,485 yd.
"	*372*	.992 of a short ton.
"	*373*	10$\frac{5}{19}$ hr.; 148$\frac{31}{38}$ mi.
"	*374*	10,892.7 mi.
148	*375*	Ex. ring, 10,573 mi.; In. ring, 17,176 mi.
"	*376*	81,000.
"	*377*	4,293 ft. 9′ 8″.
"	*378*	Acci. 99; killed, 264.
"	*379*	5 pieces.
"	*380*	f ℥ 7 f ʒ 2 ♏ 54.
"	*381*	25$\frac{4}{7}$ bu. nearly.
149	*382*	178 mi. 212 rd. 4 ft. 4$\frac{4}{5}$ in.
"	*383*	1,291,734,653 sec.
"	*384*	350 A. 157.12 P.
"	*385*	\$132.225.
"	*386*	110$\frac{1}{2}$.
"	*387*	23.17690625 mi.
"	*388*	Priv. 10$\frac{1}{5}$ A.; Serg't. 20$\frac{2}{5}$; Lieut. 61$\frac{1}{5}$; Capt. 81$\frac{3}{5}$; Major, 142$\frac{4}{5}$; Col. 204 A.
"	*389*	7 oz. 4 pwt. 16 gr.
"	*390*	\$100.46$\frac{1}{4}$.
150	*391*	16° 43′ from the E.
"	*392*	\$6617.60.
"	*393*	\$14.98.
"	*394*	49 lb. 12.358 + oz.
"	*395*	A, \$384.47; B, \$291.07; C, \$221.89.
"	*396*	Eldest, \$6,478.83; 2d, \$4,859.12; 3d, \$3,644.34; 4th, \$2,733.25 +.
"	*397*	631.
"	*398*	$\frac{1}{19}$ hhd.
"	*399*	28$\frac{64}{125}$.
"	*400*	14$\frac{230}{539}$ hhd.
151	*401*	14 ft. 2′.
"	*402*	5 yr. 76 da. 30 min.
"	*403*	83$\frac{1}{3}$ reams.
"	*404*	7 in.
"	*405*	4 h. 51 m. 16$\frac{11}{15}$ s. A.M.
"	*406*	246.75.
"	*407*	604$\frac{1}{15}$ bu.
"	*408*	\$5.20.
"	*409*	\$2.58.
"	*410*	\$1.40$\frac{10}{11}$.
"	*411*	187$\frac{1}{77}$ gal.
152	*412*	\$120.
"	*413*	\$131.25.
"	*414*	\$105.
"	*415*	\$125.
"	*416*	\$112.50.
"	*417*	448$\frac{37}{64}$ yd.
"	*418*	16$\frac{7}{18}$ cords.
"	*419*	15 carats.
"	*420*	\$5,640.585.
"	*421*	5,850 ft.
"	*422*	6$\frac{2}{3}$ oz.
"	*423*	\$140; 40 tickets.
153	*424*	60 rd. in advance; fox ran 140 rods.
"	*425*	\$213.17.

P.	Ex.	Answers.
153	*426*	11 hr. 7 m. 36 s. P.M.
"	*427*	3 hr. 52 m. 24 s. P.M.
"	*428*	1,280,785,763 hhd. 16$\frac{4}{7}$ gal.
"	*429*	51° 25′.
"	*430*	$114.40.
"	*431*	74 sq.yd.; 80$\frac{2}{3}$ sq.yd.
"	*432*	$134.899.
"	*433*	5 h.52 m.26$\frac{1}{16}$s. P.M.
154	*434*	9$\frac{3}{8}$ ounces.
"	*435*	$1250.
"	*436*	8 lb. 5$\frac{49}{72}$ oz.
"	*437*	4 bu. 5$\frac{1}{3}$ qt.
"	*438*	2 sq. mi. 254 A. 106 P. 24$\frac{5}{8}$ sq. yd.
"	*439*	80 lb. 2 pwt. 19.2768 gr.
"	*440*	24 ft. 3′.
"	*441*	$3.45.
"	*442*	$35.38+.
"	*443*	6,531$\frac{1}{4}$ planks.
"	*444*	1,500 lb. nitre; 250 lb. each of sulphur and charcoal.
155	*445*	$185.00+.
"	*446*	22$\frac{4}{9}$ Cd.
"	*447*	30 min.; 1st horse, 4,500 rd.; 2d, 3,600 rd.; 3d, 3,000 rd.
"	*448*	248,832 cu. qr. in.
"	*449*	10 hr. 54 m. 44 s. P.M. of previous da.
"	*450*	734.11\frac{1}{4}$.

CHAPTER IV.

P.	Ex.	Answers.
167	*1*	$\frac{1}{12}$; $\frac{1}{8}$; $\frac{1}{5}$; $\frac{3}{16}$; $\frac{1}{6}$; $\frac{5}{16}$.
"	*2*	$\frac{3}{8}$; $\frac{2}{3}$; $\frac{9}{16}$; $\frac{11}{16}$; $\frac{5}{6}$; $\frac{15}{16}$.
"	*3*	*10$\frac{1}{2}$ mi.; 90 lb.; 128$\frac{1}{4}$ gal.; 104.87\frac{1}{2}$.*
167	*4*	12$\frac{1}{2}$%; 8%.
"	*5*	9.08\frac{1}{3}$.
"	*6*	$520.
"	*7*	180 bu.
"	*8*	1st yr. 600 lb.; 2d, 720.
"	*9*	59$\frac{11}{71}$ gal. spirits; 3$\frac{60}{71}$ gal. water.
"	*10*	2,500.
"	*11*	3,000.
"	*12*	75 A. 75 P.
"	*13*	2 T. 13 cwt. 83 lb.
"	*14*	16$\frac{2}{3}$% purer; 1st, 75% pure; 2d, 58$\frac{1}{3}$%.
168	*15*	16$\frac{4}{11}$%.
"	*16*	$\frac{2}{7}$.
"	*17*	$\frac{5}{26}$.
"	*18*	$8.54+.
"	*19*	$46.75.
"	*20*	$723.
"	*21*	$\frac{9}{83}$.
"	*22*	25 yd. 6$\frac{2}{3}$ in.
"	*23*	20$\frac{4}{5}$%; In., $2,160,477.
169	*24*	57 men.
"	*25*	31$\frac{1}{4}$%.
"	*26*	A, £1,433 14s.; B, £1,445 17s.; C, £1134
"	*27*	$1,300.
"	*28*	33$\frac{1}{3}$%.
"	*29*	7$\frac{1}{2}$%.
"	*30*	17$\frac{2}{3}$ days.
"	*31*	14$\frac{1}{16}$% smaller; 16$\frac{4}{11}$% larger.
"	*32*	15 Cd. 7 cd.ft. 2 cu.ft.
170	*33*	20$\frac{37}{1155}$% larger.
"	*34*	525 pounds.
"	*35*	3 wk. 3 da. 6 hr.
"	*36*	8$\frac{4}{5}$ cents.
"	*37*	4$\frac{1}{2}$ yr.
"	*38*	4 hr. 22$\frac{142}{253}$ min.
"	39	10,422 bbl.

P.	Ex.	Answers.
170	*40*	\$120; \$160; \$180.
"	*41*	25%.
171	*42*	\$21.
"	*43*	Neither.
"	*44*	Gain, \$20,703$\frac{1}{8}$; rate, 4$\frac{1}{6}$%.
"	*45*	Cost, \$120; ask. \$150.
"	*46*	March 2, 1872.
"	*47*	\$13,720.05
172	*48*	\$2.00.
"	*49*	Inf'y, 525,000; cav'y, 100,000; Art'y, 66,000; Gens d'a. 26,000.
"	*50*	7's at 105% by $\frac{5}{12}$%.
"	*51*	2,825 bushels.
"	*52*	\$169.
"	*53*	3$\frac{1}{25}$ months.
"	*54*	Aug. 19, 1876.
173	*55*	\$525 direct ex.; \$430.31$\frac{1}{4}$ circ. ex.; \$94.68$\frac{3}{4}$ gain.
"	*56*	3,251,786.
"	*57*	8%.
"	*58*	\$31,801.82.
"	*59*	\$750.65.
"	*60*	32$\frac{77}{100}$%.
174	*61*	\$11,979,213.48.
"	*62*	\$1,976,995.
"	*63*	14$\frac{2}{5}$ days.
"	*64*	\$407.
"	*65*	4 oxen, \$50; 24 cows, \$25; 72 sheep, \$5.
175	*66*	\$1,600.
"	*67*	3$\frac{1}{5}$%.
"	*68*	80$\frac{3}{10}$%.
"	*69*	\$111.906+.
"	*70*	20%.
"	*71*	\$42.875.
"	*72*	\$.033 on \$1; Norton's tax, \$511.86.
175	*73*	12 men.
176	*74*	\$120.
"	*75*	\$770.
"	*76*	\$217.368.
"	*77*	\$158.315.
"	*78*	\$279.825.
"	*79*	\$63.75.
"	*80*	\$12.50.
"	*81*	\$20.335.
"	*82*	\$116.868.
"	*83*	\$10.58.
"	*84*	\$256.50.
"	*85*	\$744.79.
"	*86*	\$253.057.
"	*87*	\$33.916.
"	*88*	\$33.12$\frac{3}{8}$.
"	*89*	£35 8s.
"	*90*	£75 18s. 3$\frac{3}{5}$d.
"	*91*	£83 18s. 8$\frac{1}{375}$d.
"	*92*	\$1,920.
"	*93*	6$\frac{1}{2}$%.
"	*94*	6%.
177	*95*	\$2,625.
"	*96*	\$2,357.05.
"	*97*	808.325.
"	*98*	163$\frac{2}{10}$%.
"	*99*	2.7+%; 63+every minute.
"	*100*	\$101.06+.
"	*101*	10$\frac{1}{2}$%.
"	*102*	\$4.80; 66$\frac{2}{3}$%.
"	*103*	100%.
"	*104*	50%.
"	*105*	60%.
178	*106*	300%.
"	*107*	80%.
"	*108*	25%.
"	*109*	85$\frac{5}{7}$%.
"	110	\$754.26$\frac{2}{3}$.
"	111	\$11,119.70.

P.	Ex.	Answers.
178	*112*	$761.46.
“	*113*	$10,530.
“	*114*	$419.16.
“	*115*	$642.12.
“	*116*	$\$385.31\frac{1}{4}$.
“	*117*	$2,137.06.
“	*118*	$200.
“	*119*	$13.06.
“	*120*	$77.50.
“	*121*	50%.
“	*122*	28%.
“	*123*	15%.
179	*124*	$27\frac{77}{100}\%$.
“	*125*	$2; $3; $9.60; $.25; $.36; $.90.
“	*126*	$33\frac{1}{3}\%$.
“	*127*	21 T. 5 cwt.
“	*128*	$5.34.
“	*129*	.0192.
“	*130*	12 ct.; 27 ct.; $\$.93\frac{3}{4}$; $1.35; $2.25; $3.28; $\$4.92\frac{3}{8}$.
“	*131*	Wife and Son, $480 each; daug’r, $360.
“	*132*	$14,350.
“	*133*	$6\frac{2}{3}\%$.
180	*134*	120 reams.
“	*135*	$5,702.40.
“	*136*	72% of par value.
“	*137*	$4,698.37+.
“	*138*	$28\frac{4}{7}\%$.
“	*139*	40%.
“	*140*	$101.841.
“	*141*	75%; 21%.
“	*142*	$2\frac{1}{3}\%$; $71\frac{2}{3}\%$.
“	*143*	Lost $521.56.
“	*144*	$1.30.
181	*145*	Grain, $1,020; groceries, $950.
“	*146*	226 A. 74 P.
181	*147*	1,200 bbl.
“	*148*	$760.
“	*149*	$28,500.
“	*150*	$29,750.
“	*151*	$423.12.
“	*152*	Gold, 9 pwt. $16\frac{1}{5}$ gr.; silver and copper, $12\frac{9}{10}$ gr. each.
“	*153*	160 days.
182	*154*	$250.
“	*155*	$56\frac{1}{2}+\%$.
“	*156*	5.
“	*157*	Bal. due Sept. 2, ’74.
“	*158*	A, $9,000; B, $4,800; C, $7,200.
“	*159*	$100.
183	*160*	A, $1,000 loss; B, $500 loss.
“	*161*	$352.65.
“	*162*	B’s stock, $1,600; C’s time, 15 mo.
“	*163*	$960; $1,600; $640.
“	*164*	Same as in 163.
“	*165*	$1\frac{37}{63}\%$.
184	*166*	$13,650.
“	*167*	$5,384.12.
“	*168*	$9\frac{1}{11}\%$.
“	*169*	$91\frac{1}{4}\%$ of par value.
“	*170*	$6,302.50.
“	*171*	$830.415+.
“	*172*	$150.478.
185	*173*	3 hr. 28 m. $46\frac{11}{15}$ sec.
“	*174*	40 yr.
“	*175*	$2535.21.
“	*176*	Oct. 13, 1876.
“	*177*	$2,439.90.
186	*178*	$121.05.
“	*179*	$4,127.80.
“	*180*	B’s stock, $2,800; C’s time, 9 mo.

P.	Ex.	Answers.
186	*181*	33$\frac{1}{3}$% ; 25% ; 20% ; 16$\frac{2}{3}$% ; 14$\frac{3}{7}$% ; 12$\frac{1}{2}$% ; 10%.
"	*182*	66$\frac{2}{3}$%; 40%; 33$\frac{2}{3}$% ; 18$\frac{2}{11}$% ; 10%.
"	*183*	42$\frac{6}{7}$ yr.; 37$\frac{1}{2}$ yr.; 30 yr.
"	*184*	13$\frac{1}{23}$ yr.
"	*185*	$93.75.
"	*186*	7$\frac{1}{3}$%.
"	*187*	$1312.87.
187	*188*	Tax on $1 = .007$\frac{1}{2}$. Smith's tax, $118.
"	*189*	3 hr. 15 min. P. M.
"	*190*	Neither.
"	*191*	$525.70 +.
"	*192*	$126.02 +.
"	*193*	8,000 bu.
"	*194*	$11,377.
"	*195*	157$\frac{1}{2}$ days ; A, 35 times; B,18; C,20.
188	*196*	Gains, $24.018 +.
"	*197*	21,296 sq. ft.
"	*198*	2.75\frac{2}{3}$ cost of sheeting ; 17.91\frac{5}{6}$ cost of broadcloth.
"	*199*	$.93$\frac{3}{4}$.
"	*200*	$84.63 +.
"	*201*	8$\frac{5}{11}$ min.
189	*202*	30%.
"	*203*	20$\frac{5}{11}$%.
"	*204*	$612.50.
"	*205*	14$\frac{82}{87}$%.
"	*206*	133$\frac{1}{3}$% ; 125% ; 117$\frac{11}{17}$%.
"	*207*	16$\frac{2}{3}$yr.; 33$\frac{1}{3}$yr.; 50yr.
"	*208*	$1,040 commiss'n ; $2,820 net pro'ds.
"	*209*	$368.85 +.
"	*210*	$86.50 less.
190	*211*	61 mi.
190	*212*	Lost, $34.61 +.
"	*213*	$2,375.50.
"	*214*	4.86\frac{2}{3}$.
"	*215*	$1,858.80 +.
"	*216*	$26,163.265 +.
"	*217*	$38.65.
"	*218*	$5,369.62.
"	*219*	43$\frac{41}{63}$ yd.
191	*220*	A, $842.30; B, $918.87 ; C, $1,598.83.
"	*221*	To pay cash by $734.25.
"	*222*	$1.288.53.
"	*223*	$975.
"	*224*	$.322 —.
"	*225*	Gain, $5.25.
"	*226*	25 cwt. 60 lb.
192	*227*	$74 per inv.; 120\frac{1}{4}$ sell'g pr. to g'n 25%.
"	*228*	$3,519.29.
"	*229*	$5.50.
"	*230*	A, $1,000 ; B, $1,125 ; C, $875.
"	*231*	Males, 206,367 ; females, 186,713.
"	*232*	$3.51.
"	*233*	$1,366.44.
"	*234*	26$\frac{2}{3}$%.
193	*235*	$1,264.948.
"	*236*	$220.28 +.
"	*237*	21 years old.
"	*238*	$21,384, 1st kind ; $42,768. 2d kind.
"	*239*	$2,948.96.
"	*240*	310.
194	*241*	24 lb.
"	*242*	$8,333.37 Ent.prof.; $21,368 due from G. & Co.; $8,127.18$\frac{1}{2}$ paid A ; $8,511.43$\frac{1}{2}$ paid B.

P.	Ex.	Answers.
194	*243*	8%.
"	*244*	33.75 yd.
"	*245*	$212.50.
195	*246*	408 bu.
"	*247*	Mortg. better $\frac{5}{6}$%.
"	*248*	$1,456.51 +.
"	*249*	12 da. 11 hr. 29 m. 29 + sec.
"	*250*	$178.63.
"	*251*	912.
"	*252*	30$\frac{37}{100}$% nearly.
"	*254*	$2.23.
"	*254*	Nov. 28, 1874.
196	*255*	Oct. 21.
"	*256*	489,300 lb.
"	*257*	132.08 + gal.
"	*258*	9,440.896 + bu.
"	*259*	5,291.19 + lb.
"	*260*	.941 + Mg.
"	*261*	.4 Ha. nearly.
"	*262*	7.447 + Km.
"	*263*	281.968 Hl.; $137.73 gain.
"	*264*	3 yr. 2 mo.
"	*265*	13$\frac{1}{3}$%.
197	*266*	£1 19s. 1$\frac{7}{12}$d.
"	*267*	2 T.
"	*268*	25%.
"	*269*	$4.90.
"	*270*	25$\frac{1}{2}$ lb.
"	*271*	68$\frac{1}{4}$%.
"	*272*	$155.645.
"	*273*	A,8; B,12; C,16 mo.
198	*274*	13$\frac{7}{11}$%.
"	*275*	$1,003.12$\frac{1}{2}$.
"	*276*	11 in.
"	*277*	$3,280.
"	*278*	$1,524.07$\frac{1}{4}$.
"	*279*	$28,750.
"	*280*	$800.
198	*281*	666,900 mi.
"	*282*	36, 54, 90.
"	*283*	$26.
"	*284*	Loss 10%.
"	*285*	$\frac{4}{9}$; $\frac{1}{33}$; $\frac{83}{99}$; $\frac{178}{333}$.
"	*286*	$.\dot{7}$; $.8\dot{6}$; $.\dot{1}3\dot{5}$; $10.\dot{2}7$.
199	*287*	No more.
"	*288*	6,200 oranges.
"	*289*	$110.
"	*290*	$3,264.21 +.
"	*291*	5$\frac{5}{6}$ cents.
"	*292*	$.60 inv.val.per yd.; $.85 per yd. cost after duties, etc.
"	*293*	21$\frac{1}{6}$% gain.
"	*294*	$1,000.
"	*295*	1,440 M.
200	*296*	$600.
"	*297*	19$\frac{7}{47}$%.
"	*298*	Gained $31.81.
"	*299*	$.75.
"	*300*	3$\frac{2}{11}$ miles.
"	*301*	$240.
"	*302*	17 hr. 2$\frac{6}{7}$ min.
"	*303*	5$\frac{1}{4}$ days.
"	*304*	128$\frac{4}{7}$ years.
"	*305*	$564.40.
201	*306*	$.35 +.
"	*307*	$8,346.11.
"	*308*	Due Sept. $\frac{3}{6}$; 4 mo. 25 da. to run; $561.72 proceeds.
"	*309*	£1.
"	*310*	75%.
"	*311*	60%.
"	*312*	24 men.
"	*313*	81$\frac{1}{4}$%.
"	*314*	1,386 sq. ft.
202	*315*	39$\frac{8}{13}$%.
"	*316*	$12.50.

P.	Ex.	Answers.
202	*317*	$1.68.
"	*318*	$105.84.
"	*319*	$390.
"	*320*	$865.34+.
"	*321*	$1.80.
"	*322*	$1,200.
"	*323*	Aug. 15, $277.99; Jan. 1, $142.01.
"	*324*	132 days.
203	*325*	$.971+.
"	*326*	$5,970.
"	*327*	5.729 gal.
"	*328*	405 pounds.
"	*329*	$161.94.
"	*330*	$13,000.
"	*331*	4%.
"	*332*	$2,114.64.
"	*333*	292$\frac{1}{2}$.
204	*334*	23,490 francs.
"	*335*	20,000.
"	*336*	$5,522.
"	*337*	$75 at first; A had $18; B, $32.25.
"	*338*	$103,302.50.
"	*339*	24%.
"	*340*	A's, $180; B's, $135; C's, $120.
"	*341*	$3,029.56.
"	*342*	10$\frac{3}{4}$ months.
"	*343*	9%.
205	*344*	3,750.
"	*345*	2 mi. 200 rd. 9 ft.
"	*346*	$1,200.
"	*347*	$254.517.
"	*348*	$.14$\frac{1}{6}$.
"	*349*	$1250.
"	*350*	$2,205.189.
"	*351*	1,061$\frac{1}{4}$ sq. ft.
"	*352*	$40.
206	*353*	227 gallons.
"	*354*	June 22, 1870.
"	*355*	$1,227.13.
"	*356*	Neither.
"	*357*	185$\frac{5}{7}$%.
"	*358*	2 mo. 10$\frac{1}{2}$ da.
"	*359*	$\frac{8}{9}$.
"	*360*	A, 571$\frac{3}{7}$; B, 428\frac{4}{7}$.
207	*361*	$2,040.
"	*362*	13 bales.
"	*363*	1,000 doz.
"	*364*	16 yr. 8 mo.
"	*365*	$120.
"	*366*	$569.
"	*367*	8$\frac{1}{3}$%.
"	*368*	$7.43.
208	*369*	20$\frac{5}{6}$ yd.
"	*370*	$5,393.61$\frac{2}{3}$.
"	*371*	$5%, nearly.
"	*372*	$30, $42, $48.
"	*373*	$494.80.
"	*374*	$22 N. Y. loan.
"	*375*	55$\frac{5}{9}$%.
"	*376*	A, $684; B, $912.
"	*377*	$1.25 per bu.
"	*378*	$990.75.
"	*379*	$1,274.$\dot{0}7\dot{4}$.
209	*380*	318.81\frac{1}{4}$.
"	*381*	154 ft.
"	*382*	$556.23.
"	*383*	$47.13.
"	*384*	$242,347.93+.
"	*385*	1$\frac{3}{4}$ A.
"	*386*	May 10, 1877.
"	*387*	June 13 and Aug. 1.
210	*388*	$2,120.63.
"	*389*	16%.
"	*390*	$151.25.
"	*391*	$10.45+.
"	*392*	66$\frac{2}{3}$%.

P.	Ex.	Answers.
210	*393*	$12.00.
"	*394*	3,874$\frac{28}{223}$ years.
"	*395*	40 shares.
"	*396*	A's, $440; B's, $480.
"	*397*	$4,497.75.
211	*398*	93$\frac{9}{10}$%.
"	*399*	$2.74.
"	*400*	5$\frac{35}{53}$%.
"	*401*	3,223$\frac{11}{70}$.
"	*402*	$2,309.03.
"	*403*	11 ft. 8 in.
"	*404*	9 mo. 20 da.
"	*405*	$121.57.
"	*406*	A. 20 d.; B, 24 d.; C, 30 d.; all, 8 d.
212	*407*	$750.75.
"	*408*	500 tons.
"	*409*	$7,831.92.
"	*410*	4%.
"	*411*	71° 3′ W. long.
"	*412*	$2,046.24+.
"	*413*	$4,018.24 borrow'd; $62.61 gain.
"	*414*	540 barrels.
213	*415*	C's stock, $10,000; A's gain, $336; B's, $504.
"	*416*	100 bales.
"	*417*	10 hours.
"	*418*	B, $60; C, $50.
"	*419*	$1,104.80.
"	*420*	A, 39.156\frac{1}{4}$; B, $46-.987$\frac{1}{2}$; C, $62.65; D, 70.481\frac{1}{4}$.
"	*421*	9$\frac{3}{4}$%.
"	*422*	Nov. 3, 1875.
214	*423*	$660.
"	*424*	2$\frac{2}{5}$%.
"	*425*	*A, $588; B,* $1,078.

P.	Ex.	Answers.
214	*426*	28%.
"	*427*	30 days.
"	*428*	$.30.
"	*429*	$5,000.
"	*430*	8 hhd. 30 gal. 1 pt. 1.7 gi.
"	*431*	$780.
"	*432*	$104.
215	*433*	Sheet'g, $.12$\frac{1}{2}$; calico, $.10.
"	*434*	7 cwt. 68 lb.
"	*435*	6,912.
"	*436*	25%.
"	*437*	62$\frac{1}{2}$%.
"	*438*	8.652.
"	*439*	16$\frac{2}{3}$%.
"	*440*	135 shares.
"	*441*	$3,808.
"	*442*	10%.
216	*443*	33 min. 25$\frac{7}{15}$ sec. past midnight.
"	*444*	$4.75.
"	*445*	$125.10.
"	*446*	79$\frac{1}{5}$%.
"	*447*	25%.
"	*448*	20 mi. 90 rd. 2[illegible] ft.
"	*449*	525 hours.
"	*450*	1 gal. 2 qt. 1 pt.
"	*451*	$3,200.
"	*452*	1st, 45; 2d, 145; 3d, 275.
"	*453*	$5,010.
217	*454*	Corn, $1.50; wheat, $1.75.
"	*455*	A, $260.42; H, $135-42; M, $72.92; K, $31.25.
"	*456*	Neither.
"	*457*	$2.

P.	Ex.	Answers.
217	*458*	1%.
“	*459*	$\$1,506\frac{6}{13}$.
“	*460*	$640.49.
“	*461*	M, $2,750; N, $2,000.
“	*462*	8 cents.
218	*463*	27 pipes.
“	*464*	100 men.
“	*465*	$\$166.66\frac{2}{3}$.
“	*466*	$200.
“	*467*	$\$234.87\frac{1}{2}$.
“	*468*	$6,765.
“	*469*	416 mi.
“	*470*	25%.
“	*471*	$43\frac{3}{4}\%$.
219	*472*	162 shares.
“	*473*	$8\frac{1}{2}\%$.
“	*474*	$255.
“	*475*	$302.80.
“	*476*	$846.25.
“	*477*	$28,000.
“	*478*	$26.56.
“	*479*	$\$1.07\frac{27}{64}$.
220	*480*	322 lots.
“	*481*	4,640 eagles.
“	*482*	$400.
“	*483*	5 mo. 4 da.
“	*484*	$329.37.
“	*485*	A's, $4,156.25; M's, $\$9,228\frac{1}{8}$; S's, $\$15,215.62\frac{1}{2}$.
“	*486*	$2,237.646.
“	*487*	1 yr. and 2 yr.
221	*488*	5%.
“	*489*	Direct, $14,224.91; circ'r, $14,476.72.; gain, $251.81.
“	*490*	A's, $4,440; B's, $4,625; C's, $4,810.
“	*491*	$12\frac{1}{2}\%$.
221	*492*	$88,750.
“	*493*	$740.
“	*494*	$3,000+.
“	*495*	300,000.
222	*496*	$1,683 worth of sug.
“	*497*	$1,045.232.
“	*498*	$.387, nearly.
“	*499*	$5,400.
“	*500*	Smith's, $3,500; Boise's, $4,900.
“	*501*	$389.78.
223	*502*	28 cents.
“	*503*	$1,226.994 at 7%; $1,174.789 at 6% C.I.
“	*504*	27.
“	*505*	$50,875.
“	*506*	$2,820.
“	*507*	216 rd. 2 yd.
“	*508*	$3,346\frac{2}{13}$ bu.
“	*509*	$\$6,666\frac{2}{3}$.
“	*510*	$3\frac{31}{40}\%$.
224	*511*	$.50.
“	*512*	Paris, $\$14,285.71\frac{3}{7}$; Lond., $14,599.50. Amsterd., $14,640.
“	*513*	$47,540.304.
“	*514*	$9,142.857.
“	*515*	6,250 bu.
“	*516*	$58, nearly.
“	*517*	$17,480, $14,858, $12,920, $12,512.

CHAPTER VI.

P.	Ex.	Answers.
229	*1*	20 acres.
“	*2*	$12\frac{1}{2}$ cents.
“	*3*	$2.60; $3.00.
“	*4*	2 yr. 9 mo. 15 da.
“	*5*	3 ft. 2.72 in.
“	6	2 hr. 14 m. 21 s. A.M.

P.	Ex.	Answers.
229	*7*	$110.25.
“	*8*	156 rods.
“	*9*	35 pounds.
230	*10*	232.457 rods.
“	*11*	20, 20, 20, 60, and 40, respectively.
“	*12*	$12.66.
“	*13*	1 min. 21.99 sec.
“	*14*	$\frac{5}{27}$; farm worth $9,342.
“	*15*	H, $2,568.58 + ; G, $1,653.91 +.
“	*16*	$28\frac{1}{2}$%.
231	*17*	$640.
“	*18*	$\frac{7}{45}$.
“	*19*	Cir. less than sq. $49.16 ; sq. less than rec. $108.
“	*20*	1st, 12%; 2d, 18%; 3d, 30%.
“	*21*	Lengtn, 55.54 + in.; bung dia. 44.43 + in.
“	*22*	$122\frac{1}{2}$ feet.
“	*23*	$11\frac{1}{2}$ days.
“	*24*	180 miles.
232	*25*	$105.80.
“	*26*	Aug. 28, 1876.
“	*27*	A, $2,400; B, $3,000. C, $3,375.
“	*28*	48 + miles.
“	*29*	4,338,350 mi. 50,943$\frac{3}{4}$ in.
“	*30*	938.66\frac{2}{3}$.
“	*31*	$296.78.
233	*32*	6,866.29 + ft.
“	*33*	Bal. $498; due June 22, 1874.
“	*34*	11,094 sq. ft.
“	*35*	$5.
“	*36*	*50 lb. of each.*

P.	Ex.	Answers.
233	*37*	5.
“	*38*	$6,590.40.
“	*39*	$47.83.
234	*40*	20 days.
“	*41*	1st term, 30 ; last, 72.
“	*42*	$6\frac{7}{8}$.
“	*43*	1.156817.
“	*44*	A, $466\frac{2}{3}$; B, 833\frac{1}{3}$, C's flour $10 per bbl.
“	*45*	19.
	46	3 rd. 8 ft.
“	*47*	£7,438 14s. 9d.
“ 235	*48*	L'gth, 54 rd.; br'dth, 18 rd.
“	*49*	Oldest, $3,909.79; 2d, $3,240.30; youngest, $2,849.91.
“	*50*	Farm. gains $$\frac{1}{3}$ more.
“	*51*	38 days.
“	*52*	$3,365.94.
“	*53*	1.0188.
“	*54*	1.011619.
“	*55*	$2,000.
236	*56*	4 hr. 30 min. P. M.
“	*57*	106.08 steres; cost $450.84.
“	*58*	Face, $800; due August 29, 1873.
“	*59*	9 ft. 5.3 in.
“	*60*	$2,100.
“	*61*	$4,001.042.
“	*62*	13 A. 41.762 + P.
“	*63*	$481.37.
237	*64*	March 6, 1874.
“	*65*	1,323 Hl.; $7508.85.
“	*66*	$17\frac{2}{5}$, $32\frac{4}{5}$, $48\frac{1}{5}$, $63\frac{3}{5}$.
“	*67*	1,000 globes.
“	*68*	$.026 on a dollar.
“	69	3 ft. 8.1429 + in.

P.	Ex.	Answers.
237	*70*	13 ft. long; 336 rails.
"	*71*	8.
238	*72*	$3,331.55.
"	*73*	$1\frac{1}{4}$.
"	*74*	2,500 trees.
"	*75*	156 strokes.
"	*76*	152.05 + acres.
"	*77*	75%.
"	*78*	3.568 + rd.
"	*79*	$243.63.
239	*80*	$4.466.
"	*81*	650 balls.
"	*82*	1 lb. at 8; $8\frac{1}{2}$ lb. at 13; 8 lb. at 14.
"	*83*	June 14, 1875.
"	*84*	E, 13 mi.; F, 21 mi.; G, 32 mi.; all in 8 hr. 48 min.
"	*85*	$4,640.88.
240	*86*	Pr. per bu., 1.96\frac{43}{48}$; 23 + %.
"	*87*	$2,191.21.
"	*88*	1331000.
"	*89*	$646.
"	*90*	$4,095.
"	*91*	5 calves, 5 lambs, 30 kids.
"	*92*	$1.029.13.
"	*93*	10 inches.
"	*94*	65 pounds.
241	*95*	A, $2,640; B, $2,400.
"	*96*	141.79 + rd.
"	*97*	6 ft.
"	*98*	$1,698.548 +.
"	*99*	$49\frac{1}{2}$ miles.
"	*100*	$173,103,094,564-.40.
241	*101*	5 T. 13 cwt. 4 oz. gross T.
"	*102*	$2,791.18.
"	*103*	19,494.5 + lb.
242	*104*	$2,240.
"	*105*	M, 72.91\frac{2}{3}$; N, 102.08\frac{1}{3}$.
"	*106*	$173.93 +.
"	*107*	3,863,080.
"	*108*	92 bbl. 1st. qual.; 54 bbl. 2d qual.; 54 bbl. 3d qual.
"	*109*	$.75 and $.95 per lb.
"	*110*	Ann'ty, $1,065.85; owned farm 7 yr.
243	*111*	8 feet.
"	*112*	6 inches.
"	*113*	25 feet.
"	*114*	$8\frac{16}{26}$ thousand.
"	*115*	A's $108; B's $162.
"	*116*	$534.75.
"	*117*	$76,000.
"	*118*	A's, $16,277.21; B's, $3,341.87; C's, $2,880.92.
244	*119*	15 A. 115 P. 17 + sq. yd.
"	*120*	169.26.
"	*121*	A's, 42; B's, 21; C's, 7.
"	*122*	5.
"	*123*	$2\frac{3}{10}$% discount.
"	*124*	$4\frac{41}{124}$ lb.
"	*125*	28 pounds.
"	*126*	288,030 miles.
"	*127*	$19,757.863.
245	*128*	$206.88.
"	*129*	221 rd.; 17 rd.
"	*130*	80 in.; 60 in.; 32 in.
"	131	56 gal. at $3.25; 20 gal. at $1.80.

P.	Ex.	Answers.
245	*132*	10 min. $29\frac{53}{143}$ sec. after one.
"	*133*	$6.17+.
"	*134*	25 bu. at $1.75; 25 bu. at $1.80; 40 bu. at $2.
"	*135*	$293\frac{1}{2}$ feet.
246	*136*	$500.
"	*137*	25%.
"	*138*	$865.78.
"	*139*	8.66+ ft.
"	*140*	$650.
"	*141*	$2\frac{1}{3}$, $2\frac{2}{3}$, 3, $3\frac{1}{3}$, $3\frac{2}{3}$.
"	*142*	10.8 tons.
"	*143*	$143.64.
"	*144*	$8\frac{1}{3}$%.
"	*145*	15 days.
247	*146*	792 sq. ft.
"	*147*	$.70 on a dollar; A, $2,800; B, $3,500; C, $4,900.
"	*148*	15.06+ acres.
"	*149*	8%.
"	*150*	$30,000.
"	*151*	$29,082.62.
"	*152*	$2,735.83.
"	*153*	$63,400.
248	*154*	$16,000.
"	*155*	$$4,000\frac{7}{12}$.
"	*156*	Falls 24 ft., bounds 12 ft.
"	*157*	$72.
"	*158*	$629.426.
"	*159*	2,100 lb. at $21\frac{2}{3}$ ct. per lb.
"	*160*	135 days.
"	*161*	$855.
"	*162*	$1,000.
249	*163*	8 ft. 4 in+.
"	*164*	31 416 sq. rd.
"	*165*	$7\frac{17}{19}$%.
"	*166*	30 men, 5 women, and 20 boys.
"	*167*	Length, 63 rd.; breadth, 35 rd.
"	*168*	$4.90.
"	*169*	£173 3s. 7.368d.
"	*170*	$4,001.042.
"	*171*	Eldest, $7,057.11; 2d son, $6,633.68; young't, $6,309.21.
250	*172*	$325.03.
"	*173*	$5.
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